Gas Journal

Vol. 271. 104th Year. LONDON, JULY 30, 1952. No. 4652. Price 1/3

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DETROIT

THE
DE LA RUE
G.4.SS.

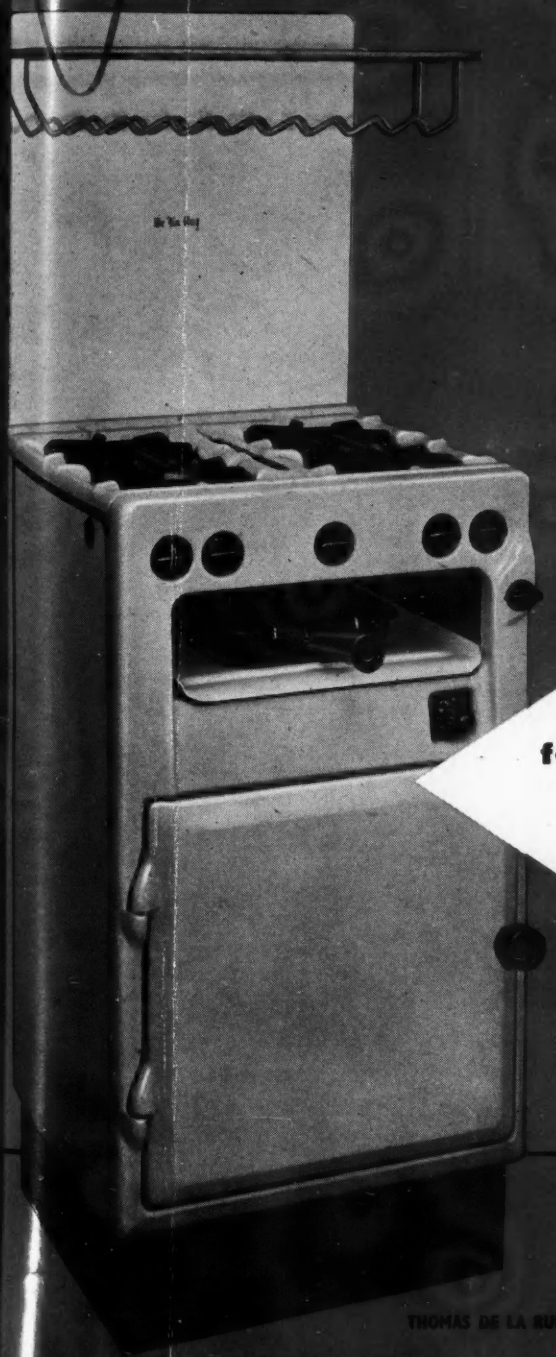

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FIG 999

The NEW

Low Pressure

SERVICE REGULATOR

WITH FIG. 999

WRITE FOR FULL SPECIFICATION

WITHOUT FIG. 999

ARREST YOUR PRESSURE FLUCTUATIONS RING FOR FIG. 999

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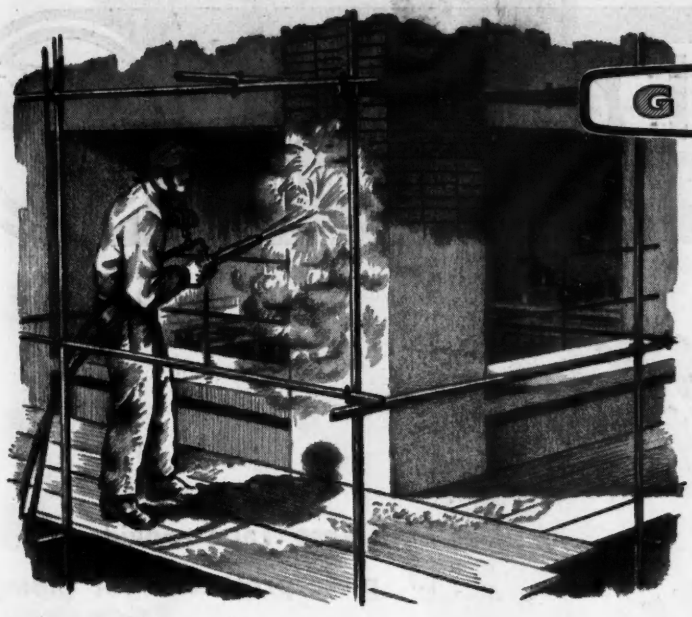

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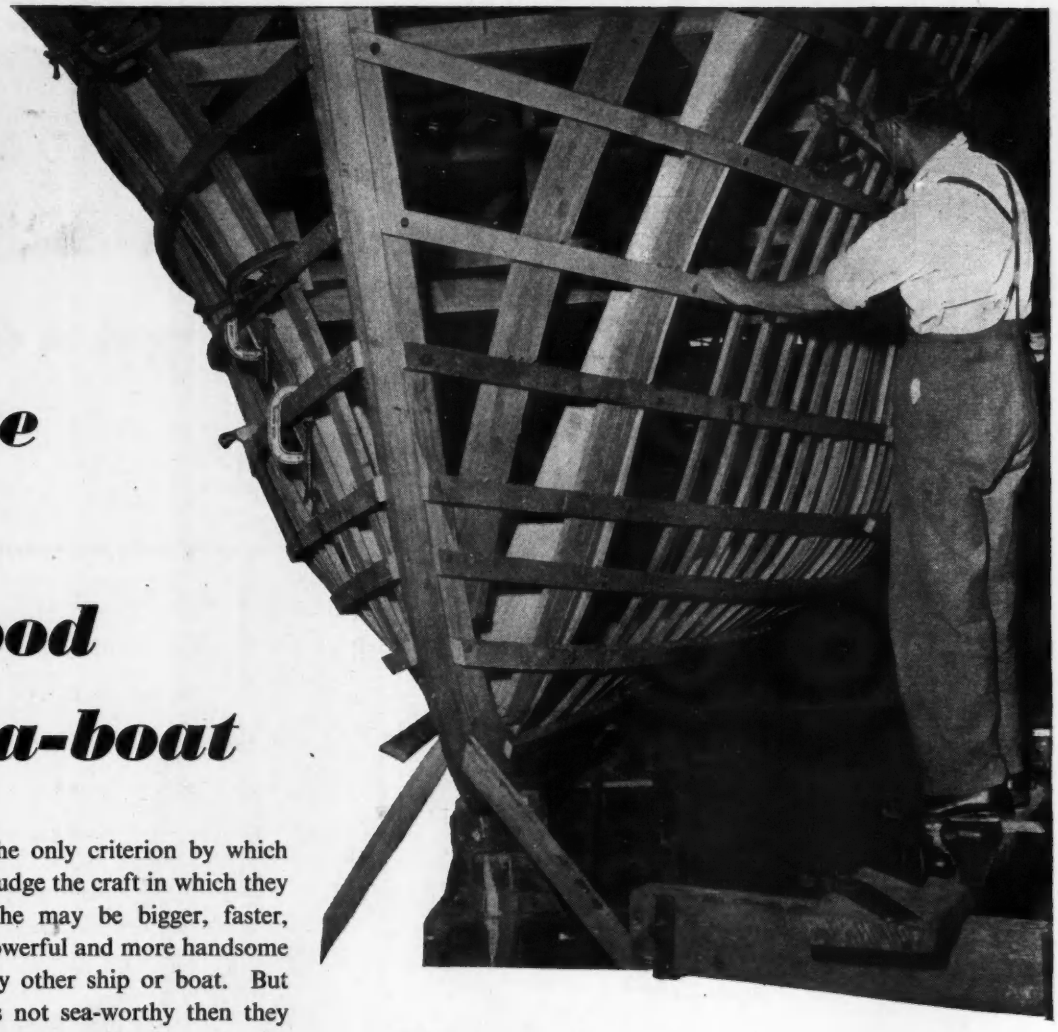

Is she a good sea-boat

—the only criterion by which sailors judge the craft in which they sail. She may be bigger, faster, more powerful and more handsome than any other ship or boat. But if she is not sea-worthy then they will have no use for her—for she is dangerous.

To be sea-worthy, a vessel has to have several qualities. The design must be first class, the materials of which she is made must be sure and sound, and the craftsmanship that went into her building must be beyond reproach. The proof of these qualities is a ✠100 A1 Certificate from Lloyds.

Although there is no comparable certificate for 'Multitest' Gas Meter diaphragms, we do insist on the same searching tests. The leather, the tanning, and the craftsmanship all must be of the very highest order.

'Multitest' makes no headlines, indeed comparatively few know of our existence. But we are content so long as those few, inside and outside the trade, know that 'Multitest' stands for dependability, durability and accuracy.

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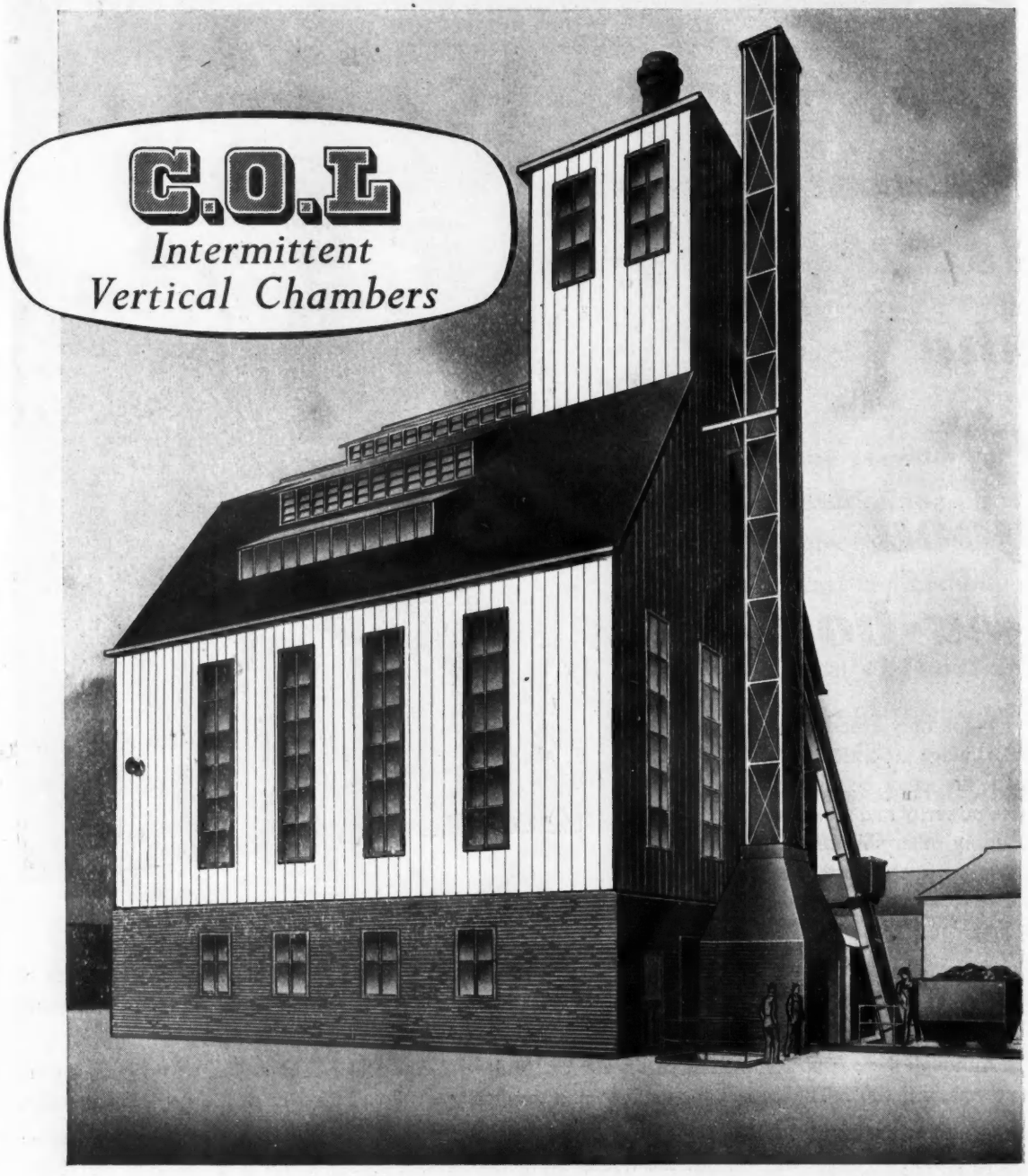

An artist's impression of the new C. O. L. Intermittent Vertical Chamber installation for the Northern Gas Board at Spital Works, Berwick-on-Tweed.

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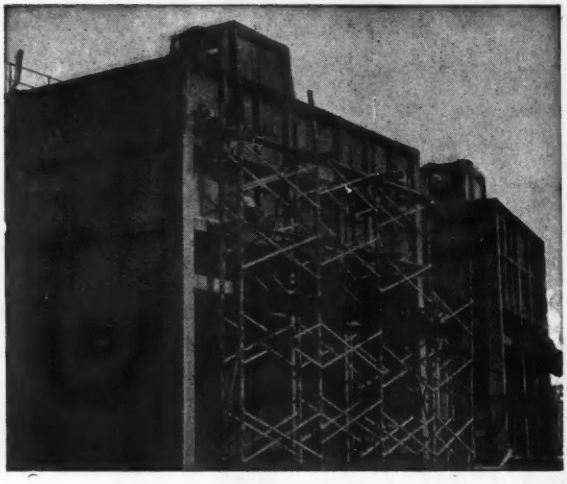
Gunite



One of the reinforced concrete structures reconditioned with Gunite for the City of Carlisle Gas Undertaking.

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have exceptional value.

For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied

For lining coal bunkers and steel chimneys it possesses great resistance to corrosion and protects steel-work from the abrasive action of coal or coke.

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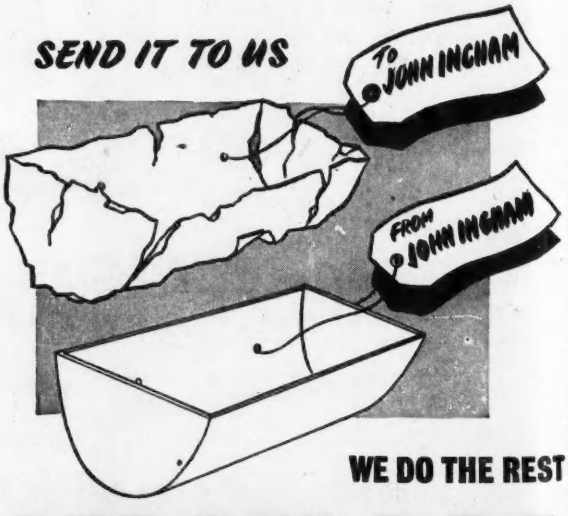

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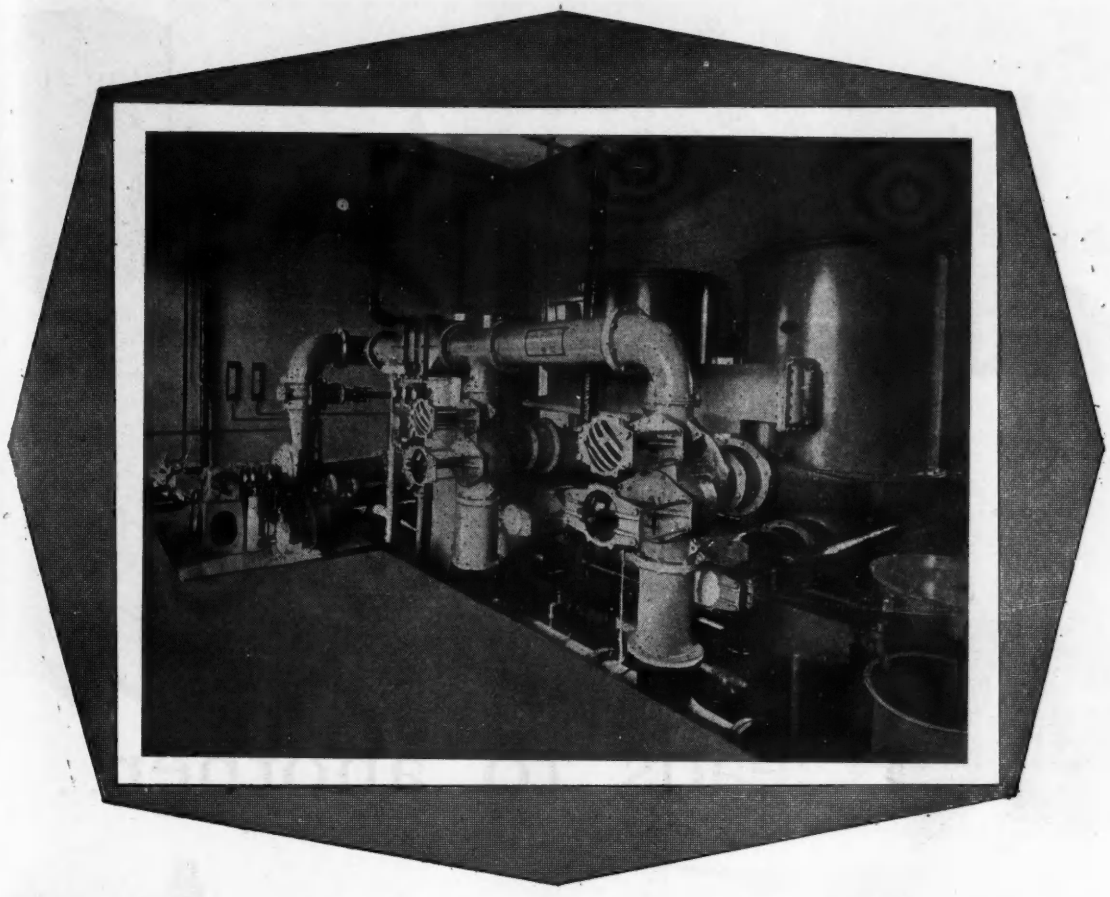

What experience means to benzole recovery in the Gas Industry!

The plant you see above is typical of many Sutcliffe Speakman plants already supplied to the Gas Industry.

They are the result of over 20 years' experience in the manufacture and use of Active Carbon for recovery purposes in every branch of industry where solvents are used. They range in size from a capacity of quarter of a million cu. ft. per day, up to 86 million cu. ft. per day, recovering millions of gallons of valuable solvent per annum, which would otherwise have gone to waste.

As applied to the Gas Industry, they extract the maximum amount of Benzole; 100 per cent. recovery having been recorded. The Benzole produced is water white, giving the highest possible distillation test. There are no secondary distillation products.

The complete unit is compact and occupies a very small amount of space. It is clean in operation entirely automatic and has a minimum of moving parts. With all these advantages the cost of the plant compares very favourably with other systems. They are extremely economical in running costs and show a very handsome return on capital investment.

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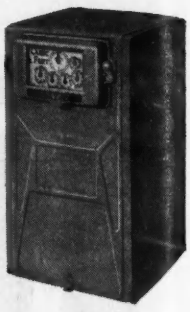
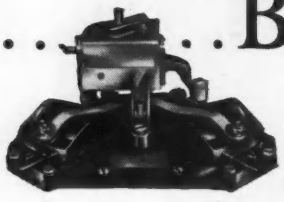


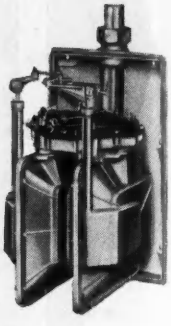
Die-cast light alloy construction machined to 2/1000ths.

...Begwaco meters..

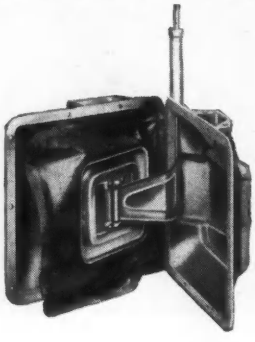


Valves of graphite-impregnated plastic, with stainless steel bearings and linkages of Monel

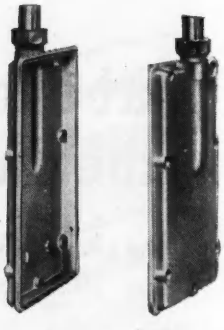
.....one good point...



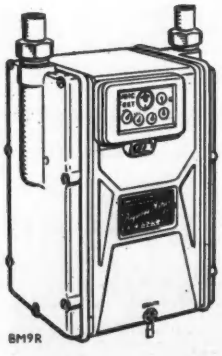
Constant volume diaphragm chambers — accuracy at all rates of flow.



..leads to another....



There is evidence of careful research in the Begwaco design. One good point leads to another. For instance, manufacture by pressure die-casting and automatic machinery — not by "tin and solder" — leads to a superior internal finish and reduces turbulence in gas flow. The design falls naturally into five basic sections, and hence dismantling and re-assembly can safely be entrusted to unskilled labour, reducing maintenance costs considerably. Low pressure absorption and almost frictionless movement are additional features. In fact, good design and the use of light alloys make Begwaco meters the best and sturdiest available.



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Precision built in die-cast corrosion-resisting light alloy

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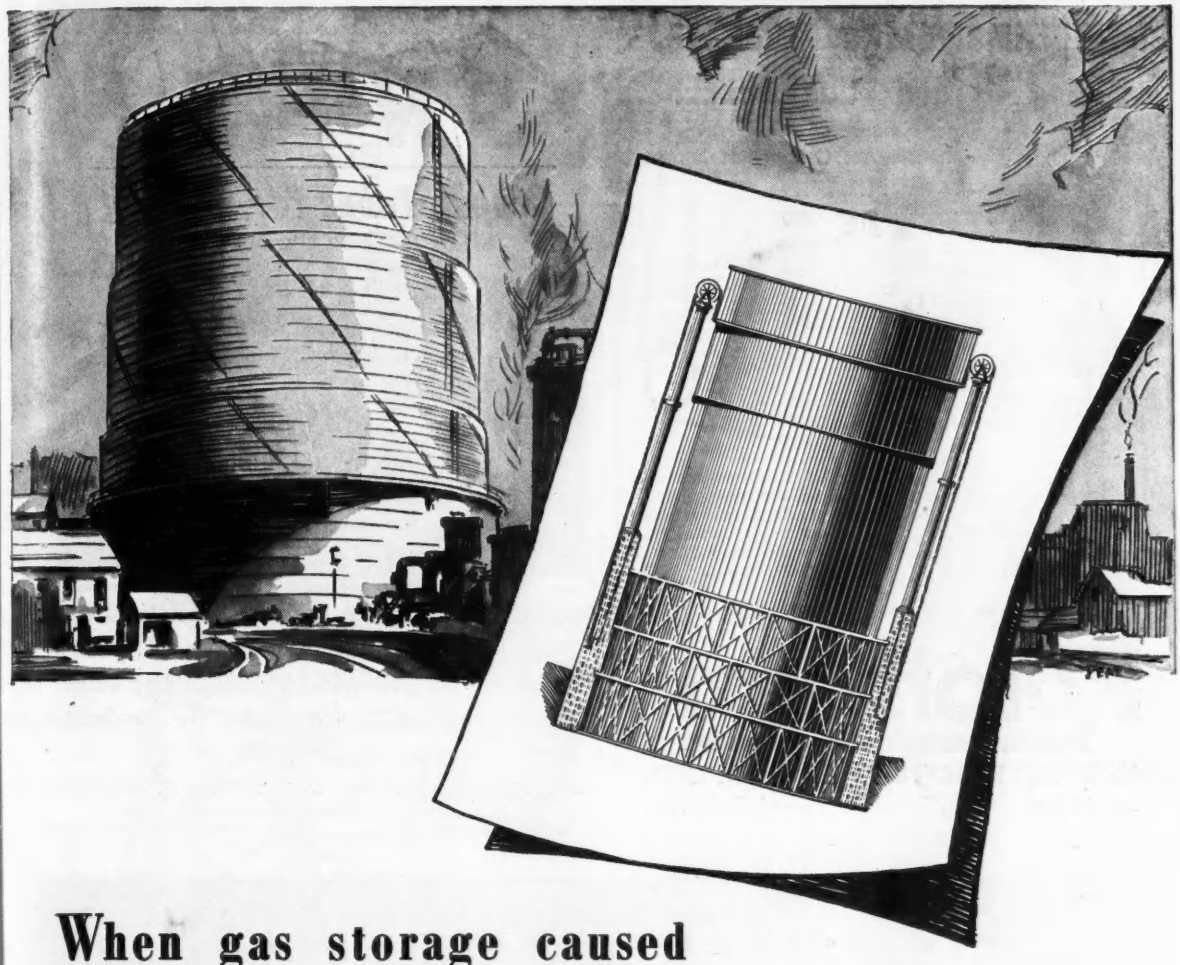

When gas storage caused *"serious apprehensions..."*

In the early days of the gas industry—to quote from a nineteenth-century textbook—"serious apprehensions were entertained respecting the danger of storing gas in large quantities". In 1823, the Royal Society confirmed this attitude by declaring that any gas holder of more than 20,000 cu. ft. capacity was dangerous, and a contemporary Government report, referring to two large canvas bags in use as holders at a Whitechapel works, hints at the dreadful consequences that might arise from the accidental ignition of this "artificial volcano".

However, many of the early gas holders were so small that official qualms on the subject were unnecessary. An idea of the size of one called the "Good Intent" erected in 1816 can be gained from the fact that its cost was only £757.4.9. The engraving shown here depicts a very early gas holder used by the City Gas Company. The modern spiral-guided gasholder as constructed by Balfour can be designed for any required capacity, subject only to economic considerations and limitations of space on site.

The Balfour Organisation with its vast experience of gas engineering practice offers an unparallelled service for the design, manufacture and installation of complete gas storage plant.

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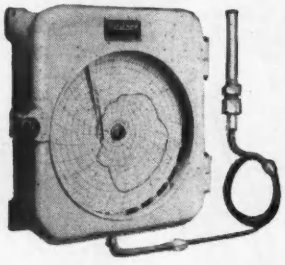

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MT9 *Photo: By courtesy of the Director of Housing, Corporation of Glasgow.*

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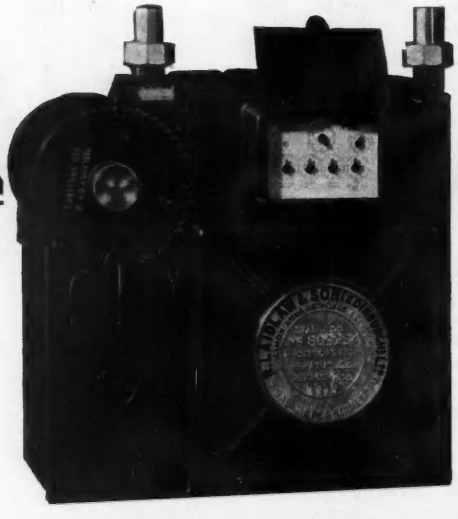

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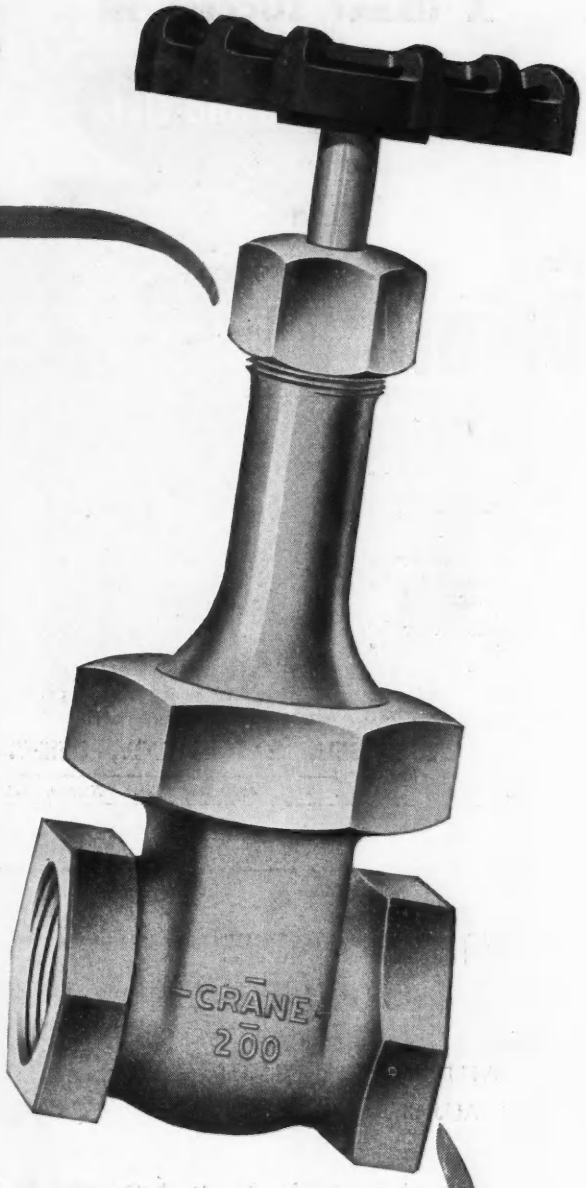
THE D180 GUN METAL GATE VALVE

Industry, ever on its toes to speed up output, demands valves which require minimum attention during service. Crane, equally up-to-the-minute, announce their new D180 Valve which, with its nickel alloy disc, particularly meets the latest requirements. Write for Leaflet No. 382.

D180 Gun Metal Gate Valve, union bonnet construction, rising stem, suitable for saturated steam working pressures up to 200 lbs., 500°F., sizes ¼" to 2", screwed ends. This valve has a Crane Nickel Alloy disc; the body seat rings are integral with the body. A feature of the bonnet construction is that the union ring nut provides a strong tight joint; it can be easily dismantled and reassembled without danger of injuring the valve.



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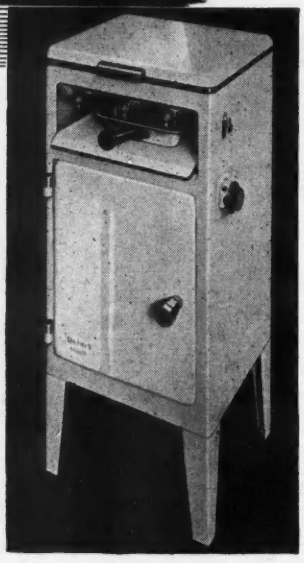

The

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MINOR

This efficient little cooker of large capacity is made especially for small kitchens and flats.

Its cast iron construction ensures durability and low maintenance cost.

For hire purchase or for simple hire the Dainty Minor is ideal.

Approved and adopted by leading gas boards.

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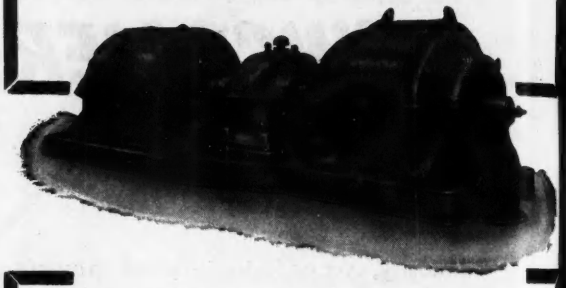

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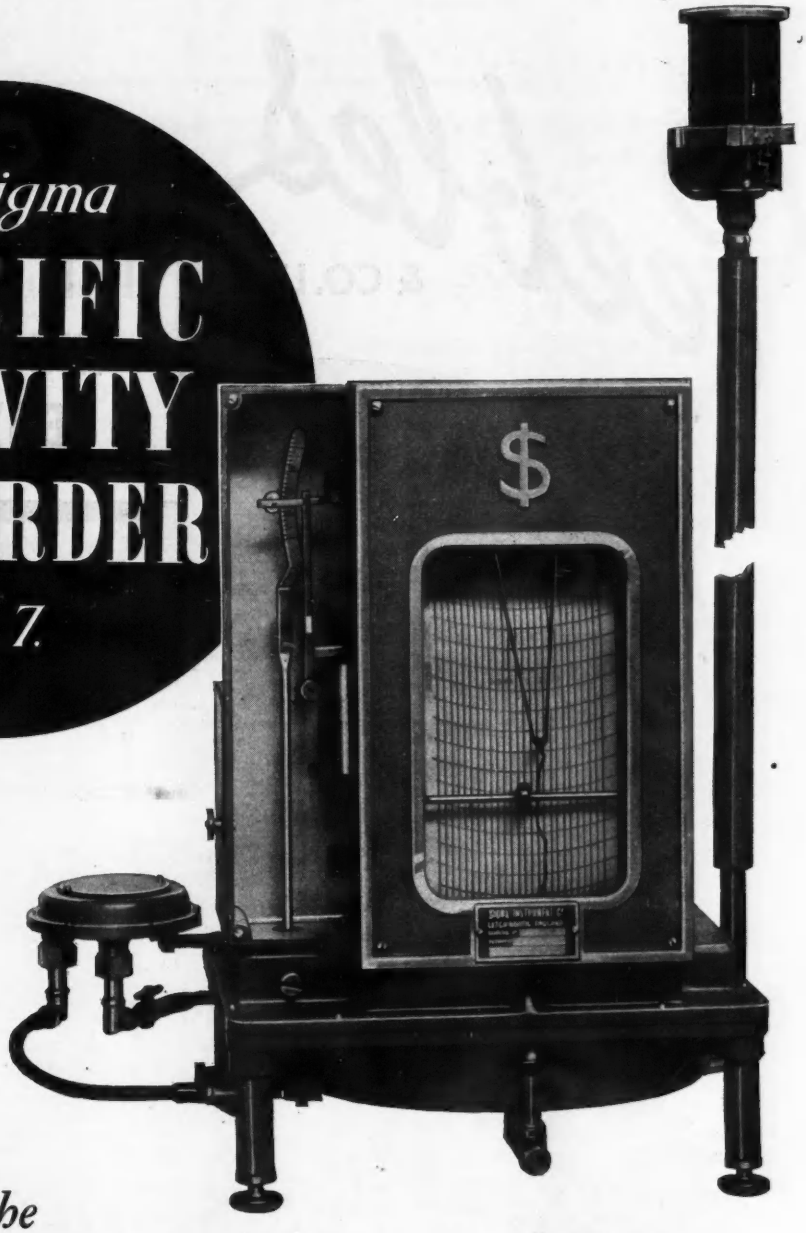

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The SIGMA Specific Gravity Recorder measures the buoyancy of a column of gas 6 ft. high by 10 ins. diameter (1830 mm. x 254 mm.) and records the specific gravity on a controlled movement chart.

The Recorder is sensitive and robust. Whilst the standard range of chart ruling is for s.g. ·4 to ·65 other ranges are available.

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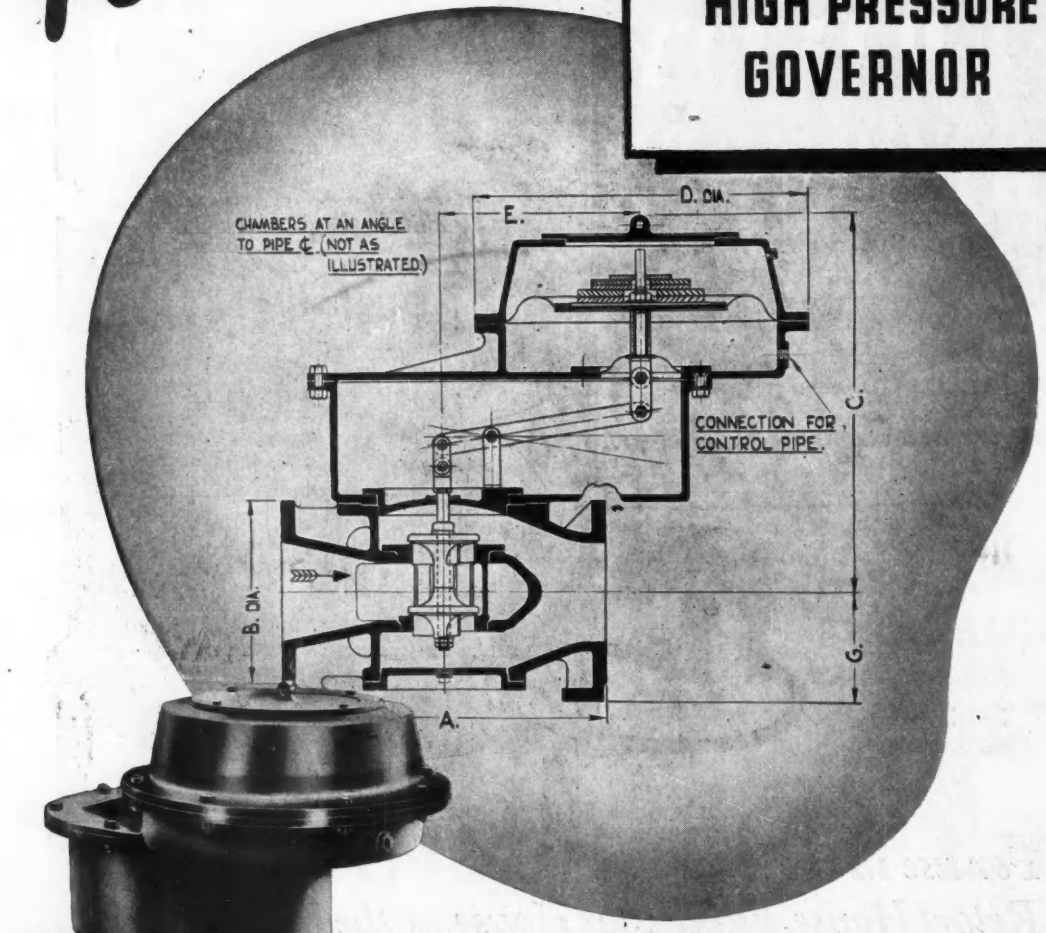
THE FIGURE 124
HIGH PRESSURE GOVERNOR



A simple and robust governor, purpose-designed for high inlet pressures. Outlet pressures are easily adjusted, and a tight shut-off at zero throughput is guaranteed.

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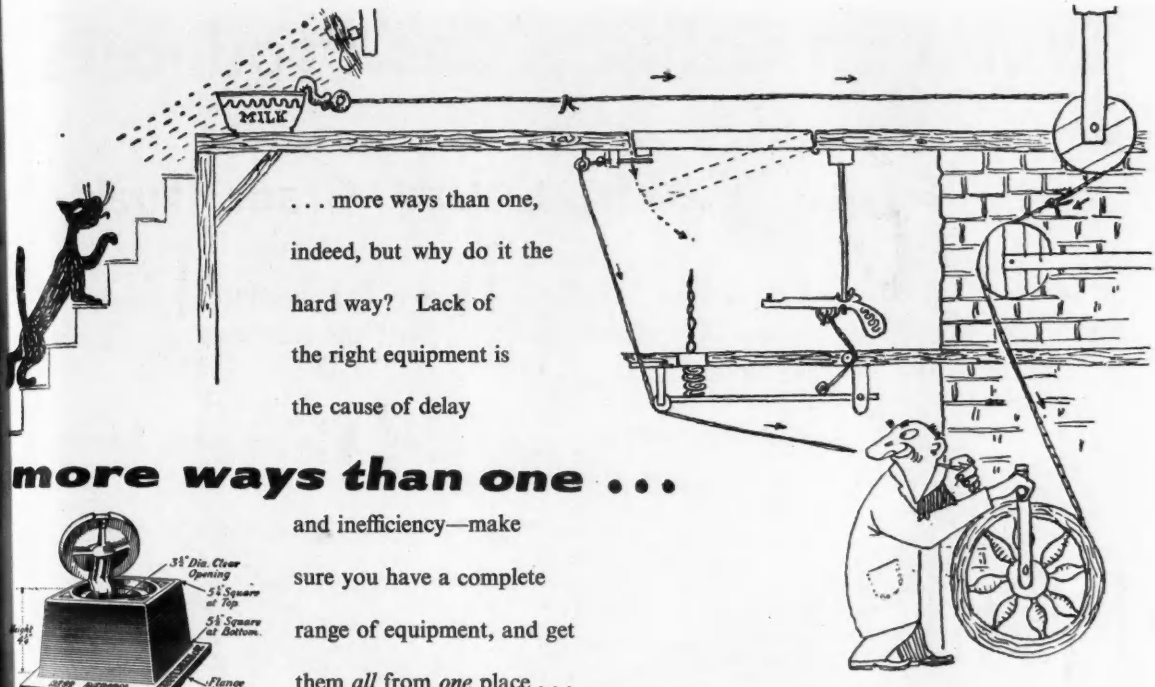
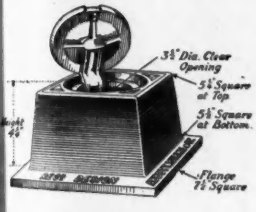


. . . more ways than one, indeed, but why do it the hard way? Lack of the right equipment is the cause of delay

more ways than one . . .

and inefficiency—make sure you have a complete range of equipment, and get them *all* from *one* place . . .



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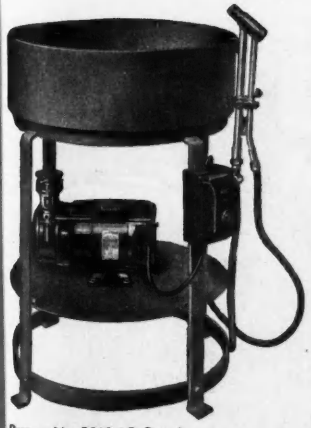

Pattern No. B010. LB. Revolving Brazing Hearth, with legs for floor mounting, and complete with motorised ESV. Blower for supplying compressed air to a blowpipe.

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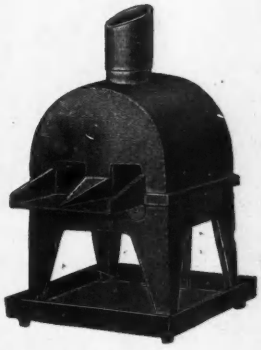

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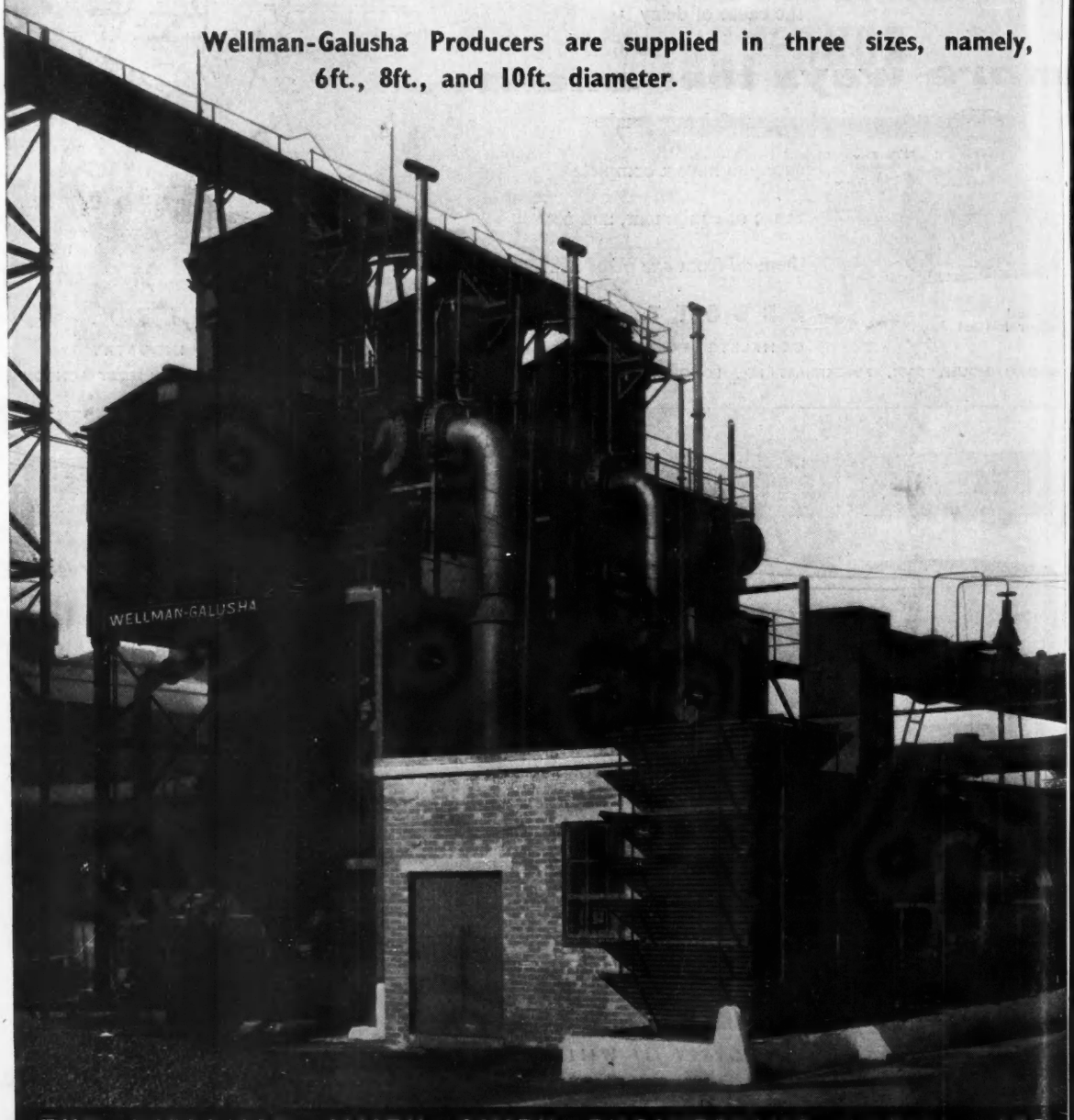

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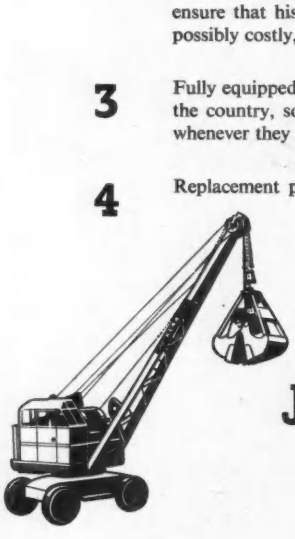

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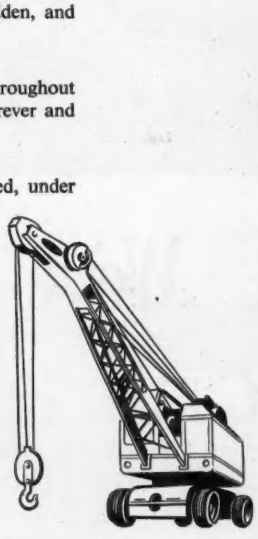

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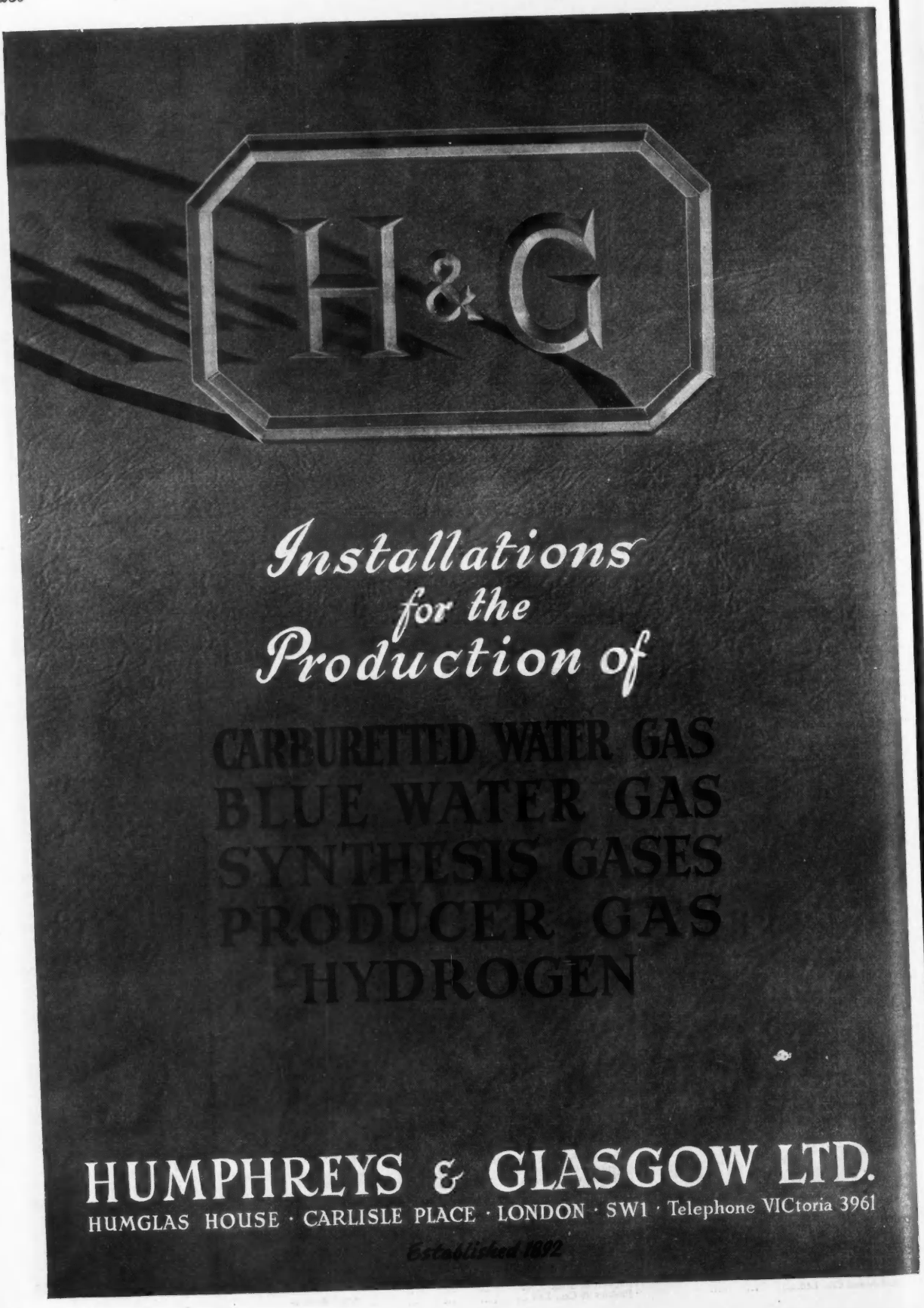
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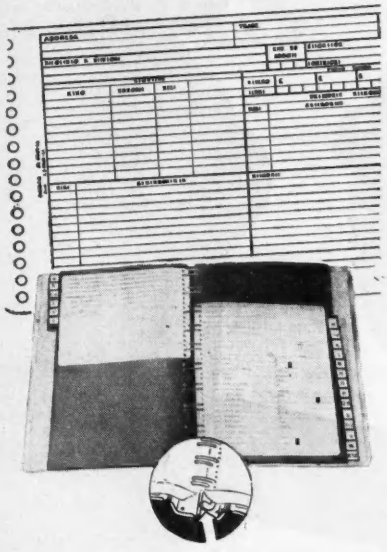

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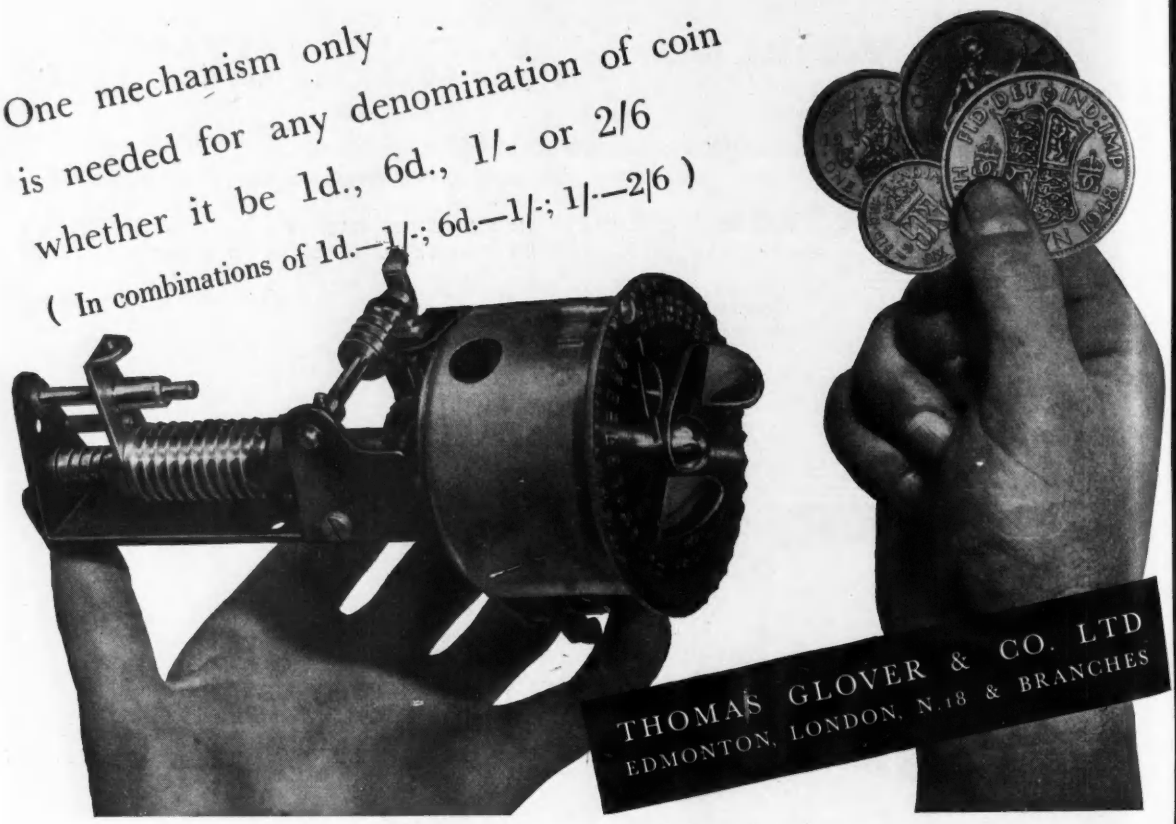

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PROBLEM OF THE PEAK LOAD

THOUGH there may be little which is particularly new or startling in the contribution 'Alternative Methods of Gas Production' made by Mr. J. E. Davis to the fifth International Gas Conference held last month in Brussels, it is certainly a penetrating essay on a subject of first magnitude, and we call attention here, very briefly, to part of the reasoning underlying the paper and to certain of the deductions made. Since the war changing conditions have altered the cost structure of the gas industry. Today thought is concentrated on net material costs and plant costs and the relationship of these two elements; and this brings us to Mr. Davis's analysis of the peak load and to the important fact that 'the maximum economy in meeting demand requires the installation of a mixture of types of plant in which the ratio of net materials cost to plant cost shall be different.' We are much concerned with the results of coal gas, carburetted water gas, and oil gas on the overall economy at which gas can be supplied, and we become more and more impressed with the flexibility of the gas-making process; therein lies the gas industry's strength.

The incidence of the peak load has been the subject of much thought and discussion during recent years, and the comments of Mr. Davis on this very real problem are of particular interest. The author recalled the work of Mr. F. M. Birks, who has done so much to clarify thought on the matter. His classic paper at the fourth International Gas Conference in London in 1949 (*Journal* of July 6, 1949) was extremely helpful in this direction. By single line charts he showed the intensity of the problem associated with peak loads in a severe winter, and he pointed out that there are really three types of plant which have to be selected by a large gas undertaking—plant to take base load, plant to take the seasonal load, and plant to take the emergency load. The 1952 paper by Mr. Davis is also concerned with this factor. The author tackled the subject by way of a seasonal load curve showing the norm with lines of probable deviation from the norm—a method which places emphasis on the regular seasonal variation with temperature and shows the days of the year upon which abnormal peaks may be expected and the likelihood of those peaks occurring. This method of approach is obviously useful in planning the programme of operation of plant, and it brings out the important fact that 'the most severe and embarrassing variations are unpredictable both as regards their magnitude in any particular year and as regards the time of their occurrence.' Both methods of approach demonstrate the need for a mixture of plants in the interests of economy; and Mr. Davis commented on the influence of geographical situation on net materials cost, the geographical factor affecting the cost of coal gas manufacture but not, to any appreciable extent, the cost of manufacture of carburetted water gas. The conclusion is drawn—and it is one to be underlined—that while the output curve may suggest a certain proportion of carbonising plant to total plant as being appropriate at one works where coal costs are relatively low, the same demand curve will require a smaller proportion of coal gas plant at a works where coal is more costly. In 1949, Mr. Birks suggested that the total gas-making capacity of a works might be in such proportions as 50% to 65% coal gas plant, 40% to 25% carburetted water gas plant, and 10% oil gas plant; but he was at pains to emphasise that any such proportions should be modified with changes in the coal to oil price ratio or with alterations in other price relationship, such as that between capital plant and raw materials.

In his present paper, Mr. Davis exemplified his general argument by reference to the extensive area of supply comprising South London and its contiguous rural districts. He discussed the variation in output from the curve of normal seasonal demand for this area over a number of years, showing that while the maximum gas output on the highest single day may at times reach 1.7 times the mean, there is only a 1 in 1,000 chance that the mean day of the maximum week will be as high as 1.6 times the mean. He added that it is, of

course, impossible to guarantee that there will never in any circumstances be a demand in excess of this figure, as also it is impossible to be certain that on the peak day every unit of plant will be available at its full capacity. At times of exceptionally severe weather there is increased risk of breakdown of plant; difficulties of travel and the incidence of sickness may reduce the labour force available; a high proportion of stored coal may have to be used. In brief, when the demand for maximum output is greatest, the chance of maintaining maximum output is least. For this reason, argued Mr. Davis, it is prudent to assess plant capacity at that which can be maintained for prolonged periods and to use the fact that most plant can be operated for short periods in excess of its rated capacity as an insurance against the difficulties which severe weather and maximum load must bring. If this is done, the installation of plant with a normal capacity of 1.6 times the mean day carries with it its own insurance against peak day difficulties.

'EMERGENCY' PLANT

THE deductions made by Mr. Davis from analysis of the seasonal load curve for the South London area are of such interest that we quote freely from his paper. The author showed that the average winter output is 1.25 times the mean day, with peaks rising to 1.4 times the mean day. The normal seasonal variation moves between 0.75 of the mean day for the summer period and 1.25 of the mean day for the winter period. The unpredictable and occasional peak is the difference between 1.25 and 1.6 times the mean. While the range between 0.75 and 1.25 can be covered conveniently and economically by combinations of suitable proportions of carbonising plant and water gas plant, there is a need for special treatment to cover the range between 1.25 and 1.6 times the mean. In regard to meeting the normal seasonal variation, given a load factor of 240 days working per annum, coal gas made at the riverside works of the South London area shows a lower overall cost than carburetted water gas at 500 B.Th.U., the higher plant cost for the carbonising process being more than compensated by the lower net materials cost of coal gas compared with water gas. On the other hand, at the works remote from the river the rail charges increase the net materials cost of the carbonising process and there is then little to choose in overall cost between coal gas and water gas. As the load factor becomes less than 240 days per annum, the process with the lower plant cost scores at the expense of that with the lower materials cost, and at the inland works carburetted water gas forms a substantial proportion of the make throughout the year, even though no peak periods are encountered.

The plant required to cover the difference between 1.25 and 1.6 times the mean—*i.e.*, the peak output—is not, Mr. Davis asserted, likely to be used more than 30 days in a severe winter or more than six days in the average year. In these circumstances plant cost becomes all-important and materials cost of comparatively small significance. One would not, he pointed out, choose carbonising plant for 'emergency' duty—and for such duty the case with water gas is little better. Hence the search for gas manufacturing processes which shall have a very low plant cost, even though the raw materials they use may be expensive and gasified at something less than maximum efficiency. And conventional gasholder storage offers no answer to the problem of meeting severe peak loads. Storage in holders becomes impossibly costly if the holders have to provide for storage for more than one day's output over and above the normal storage required to smooth out hourly and daily fluctuations. The amount of gas required to cover the peak period of a severe winter over and above the output of plant rated at 1.25 times the mean day may be as much as five days' make, so that storage by orthodox means is out of the question.

OIL GAS AND SPECIFIC GRAVITY

HOW, then, are we to meet the situation? One way to provide storage to meet peak requirements involves the use of liquified petroleum gases, propane and butane, for release during the period of peak demand. Such gases must be purchased from oil refineries, and the plan might result in practice in passing to the oil refineries the problem of meeting peak demands. The search must continue for gas producing processes of low plant cost, with liquid hydrocarbons as the raw material. Last week we referred to the peak load oil gas plant at Southall (a plant of a capacity of 3 mill. cu.ft. per day at 520 B.Th.U.) for the manufacture of gas by the partial combustion of gas oil. Mr. Davis mentioned the Stanier and McKean catalytic gasification now in course of development from the pilot plant to commercial unit. The capital cost of the plant is likely to be so much lower as to compensate for some enhanced cost of gas-making materials. The plant can quickly be brought into operation and taken out of commission, and it is possible that purification costs will be low. Its success will depend on its ability to produce, with the heavy residual oil of the petroleum industry as raw material, a gas of density and calorific value such that it can be introduced into the supply system without upsetting the functioning of appliances.

Mr. Davis did in fact comment on this aspect of the problem. He remarked that the normal programme of plant operation to meet seasonal variation in loads produces a higher proportion of carburetted water gas during winter months than in the summer months, with a consequent increase in the specific gravity of the gas—and the higher the specific gravity the lower the output. Indeed, in his Presidential Address to the Institution of Gas Engineers last year, Mr. Birks remarked that the reduction of output on days of maximum demand in the area of the North Thames Gas Board, due to increased specific gravity, could be as much as would be required to provide the gas supply to the City of Liverpool. Increase of specific gravity at the same calorific value means a reduced thermal input to gas appliances, and the reduction occurs at the very time when demand for heat is greatest. Mr. Davis suggested that it would be in the interests of good service to arrange that at these times, when a high specific gravity is inevitable a calorific value somewhat in excess

of the normal should be supplied so that the Wobbe Number may be controlled within reasonable limits. In such circumstances, he argued, a peak load gas having a calorific value higher than that of the normal supply would be valuable not only as a means of increasing the total quantity of gas available, but also in correcting for the effects of high specific gravity. This suggestion offers a wide field for speculation and argument—too wide for us to enter at this juncture. There is little doubt, however, that thought should be given to the provision of good service to the consumer, and the gas appliance maker's point of view should be taken into account in considering the economics of gas manufacture and the meeting of peak loads. Also there is little doubt that the products of the oil industry will be more largely used for the supply of town gas and will help considerably in satisfying peak load requirements.

INCREASE IN COAL PRODUCTION

COAL stocks have nearly reached the 17 mill. tons needed as a minimum reserve for safety at the start of the coal winter on November 1—and there are more than three months of the summer still to go. In the week ended July 12 the stock level rose by 346,000 tons to 16,875,000 tons, more than 3,700,000 tons up on the level at the same time a year ago. Stocks at gasworks amounted to 3,044,000 tons (4.7 weeks' supply), compared with 2,198,000 tons (3.5 weeks' supply) at the comparable date in 1951. The week ended July 12 saw the second highest export figure for the year so far, and already over 2 mill. tons of the planned increase of 3.5 mill. tons for the year has been achieved. In that week also another 200 recruited miners raised the total labour force to 719,200, against 701,100 last year. This increase was reflected fully in the number of face workers, which rose by 200 to 295,200, compared with 288,800 in 1951. So far this year colliery manpower has averaged 711,700 weekly, against 700,300 in the first 28 weeks of 1951.

Personal

Mr. Alfred B. Seton, M.B.E., late Sales Manager to the South Eastern Gas Board, has been appointed Sales Director to Willey & Co., Ltd., the Vulcan Stove Co., Ltd., the Sutherland Meter Co., Ltd., and Nicholls & Lewis, Ltd., subsidiary companies of United Gas Industries, Ltd. The appointment takes effect from the end of August.

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Mr. A. Robert Jenkins, J.P., A.I.MECH.E., deputy Managing Director of Robert Jenkins & Co., Ltd. of Rotherham, was installed as President of the Institute of Welding for 1952-53 at the annual general meeting of the Institute on July 22 at the Institution of Civil Engineers. Mr. Jenkins, who was educated as a mechanical engineer at Sheffield University and as a pupil apprentice with W. H. Allen and Sons, Ltd., of Bedford, entered the family business at Rotherham in 1931 as Plant Maintenance Engineer. Shortly afterwards he took charge of the Works Progress Department, became Works Manager and a Director in 1934 and in 1946, as Works Director, became responsible for the whole of the production and technical side of a works now producing about 1,000 tons of fabricated products a month. The new Vice-President is **Mr. H. B. Fergusson,** M.I.N.A., M.I.MECH.E., M.E.I.CANADA, who for 15 years has been a Director of G. A. Harvey & Co. (London), Ltd.

The South Eastern Gas Board has set up a central construction department responsible for the planning and progress of major constructional work throughout the area. **Mr. C. Stott,** M.C., B.SC., M.I.CHEM.E., M.INST.GAS E., Deputy Chief Engineer, has been appointed to take charge of it. **Mr. T. W. Gibson,** M.INST.GAS E., at present Divisional Engineer of the Kent Suburban division, will succeed Mr. Stott as Divisional Engineer of the Metropolitan Division on January 1, 1953. **Mr. T. A. Canning,** F.C.S., M.INST.GAS E., Station Engineer, Rotherhithe works, has been appointed to succeed Mr. Gibson as Divisional Engineer of the Kent Suburban Division.

Mr. Stott was a student at Leeds University from 1912 until 1914 and after serving in the 7th Duke of Wellington's (West Riding) Regiment in the first world war, when he won the Military Cross and was mentioned in despatches, he returned to Leeds University in 1919, obtained a Science Degree and, in the following year, his Diploma in Gas Engineering. From 1920 to 1922 Mr. Stott was Chief Assistant Chemist to the Farnley Iron Co., nr. Leeds, and from 1922 to 1926 Chemical Engineer and Assistant Manager to the Magnesite Syndicate, Ltd., Suramangalam, S. India. Mr. Stott joined the South Metropolitan Gas Company in 1926 as a Plant Superintendent, and from 1932 held successive appointments as Works Superintendent in charge of the Metro-Coalite works, Assistant to Engineer, and subsequently Engineer in Charge of the East Greenwich Station. During his tenure of this post he was appointed Assistant Chief Engineer to the Company. When the industry was nationalised, Mr. Stott was appointed Deputy Chief Engineer of the South Eastern Gas Board and Engineer of the Board's Metropolitan Division.

Mr. Gibson entered the service of the South Metropolitan Gas Company in 1919 and after six years' engineering training course, in which he passed through all departments including the chemical laboratory and lighterage department, he went into the drawing office and was responsible for the inspection of plant and material in contractors' works in all parts of the country. Mr. Gibson was appointed Assistant to Chief Engineer at the East Greenwich works in 1927 and in 1930 became Works Engineer at Bankside works (now closed down). He was appointed Works Superintendent in the South Suburban Gas Company in 1932 and became Chief Engineer in 1947. On the formation of the South Eastern Gas Board he was appointed Divisional Engineer to the Kent Suburban Division.

Mr. Canning, entered the gas industry in the service of the Newport (Mon.) Gas Company and received his training under the direction of his father, the late Mr. J. H. Canning, O.B.E., J.P., a past President of the Institution of Gas Engineers. Following appointments with the Dewsbury Corporation Gas Department and the Woking District Gas Company, he entered the service of the South Metropolitan Gas Company in 1928 as Assistant Engineer at East Greenwich works. In 1932 he was appointed Works Superintendent at the Bankside works and took up his present position at Rotherhithe in 1936. He is a past President of the Wales and Monmouthshire Junior Gas Association and a member of the Bermondsey Local Employment Committee, Ministry of Labour and National Service.

Mr. H. W. Rumble, 23, Queen Mary Avenue, Camberley, Surrey, has joined G. L. Howarth & Co., Ltd., Burnley, makers of the 'Rapid' washing machine, etc., as representative for London and the South Coast. Previously Mr. Rumble has represented Alder & Mackay Ltd. His telephone number is Camberley 2041.

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Mr. Ivor R. Cox, Managing Director of Metropolitan-Vickers Electrical Co., Ltd., has been honoured by the University of Wales in the conferment of the honorary degree of Doctor of Science in recognition of his outstanding services to the electrical industry. Mr. Cox took his B.Sc. degree at the University College, Cardiff, where he was South Wales Institute of Engineers Scholar and Page Prizeman. He was elected to the board of Metropolitan-Vickers in 1944 and in 1945 he became Managing Director.

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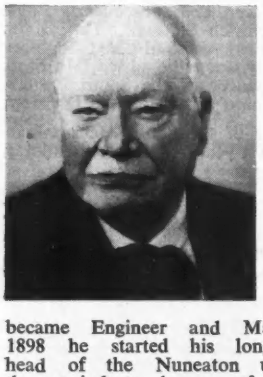
Mr. Eric Shaw, Sales Director of the Oughtibridge Silica Firebrick Co., Ltd., and a Director of Monolithic Dolomite, Ltd., Streetley, has been elected to the council of the Refractories Association of Great Britain. A member of the Iron and Steel Institute, he is widely known in steelmaking circles, and has for many years been specialising in basic refractories, in particular basic hearth monoliths, and was a member of the Basic Furnace Linings Committee.

Obituary

GEORGE HELPS

Mr. George Helps, who retired from the Board of the Nuneaton Gas Company in 1946 after many years service as Engineer, Manager, and Secretary, died at Burnham on Sea on July 21 in his 88th year. On his retirement he was succeeded by his son, Mr. George Helps, Junr., who had been associated with the Company for 34 years, the last 20 years as Assistant Engineer and Manager, and who remains Engineer and Manager of the Nuneaton undertaking of the West Midlands Gas Board. Educated at Christ's Hospital Mr. Helps took up journalism in his early days and was a reporter on the *Bath Herald* before entering the service of the Bath Gas Company, of which his uncle was secretary. Later he became Assistant Engineer to the Hastings and St. Leonards Gas Company and subsequently went as Assistant Engineer and Accountant to the Bahia Gas Company, South America. After two and a half years he returned to London, and then went to Portugal. Returning to England about 1894 he became Engineer and Manager at Hinckley, and in 1898 he started his long and active career at the head of the Nuneaton undertaking, made notable in the gas industry because of the introduction of his new idea of distributing low calorific value gas at pressure above that normally used. For many years Nuneaton was unique in having a gas of 200 B.Th.U., of which he was a most fervent advocate, and it was not until the linking up of the town with larger neighbouring undertakings within the past four or five years that consumers received gas of 450 B.Th.U. value.



Mr. Helps put forward his suggestion in 1900 and laid three miles of pressure mains from Nuneaton to Stockingford. About 1905 he invented a widely used multiple mantle burner, and he was said to be the first to start welded steel mains for high pressure gas. His cooker burner and coke fire inventions are well known. Mr. Helps had indeed a fertile mind and many were the inventions for which he was granted patents—ideas which, modified, are to be found in practical application today. A pamphleteer of drive and distinction, he was never afraid to say what was on his mind, whatever the occasion and whatever the dignity of the gathering. Official meetings of gas associations were for many a long year enlivened by his presence and his fiery comment. As a typical example we may recall a meeting of the Manchester District Institution of Gas Engineers in 1918. In discussion, he maintained that a quart of water could be boiled in the same time whether the gas was of low or of high calorific value—and he added that he would bet anyone in the room a hundred guineas if it was not so. Mr. Isaac Carr promptly took on the bet, and the matter was duly reported in the *Gas Journal* as an 'incident.' Owing to some slight disagreement as to conditions of test, the then President of the Association returned to Mr. Isaac Carr the hundred guinea cheque he had deposited with the Association. In his advocacy of low C.V. gas Mr. Helps had an ardour which was quite unquenchable. In 1932 he was again a pioneer for the gas industry in the development of an all-gas house, to the total exclusion of raw coal. As a member of the Atherstone Hunt for many years he was an enthusiastic follower of hounds, and many will remember with most pleasurable thoughts what a generous, gracious, and jovial host George Helps was. He was a Past Master of the Knights of Malta Lodge, Hinckley, and the oldest living member of that Lodge. Mr. Helps had been a Member of the Institution of Gas Engineers since 1898. He leaves three sons and two daughters.

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Councillor M. F. Jennings, J.P., of Saxmundham, a member of the Eastern Gas Consultative Council and of its Ipswich Divisional Commitee since their formation, died last month.

Diary

July 31.—North Thames G.C.C.: Westminster City Hall, Charing Cross Road, 2.30 p.m.

Sept. 2.—East Midlands G.C.C.: Victoria Station Hotel, Nottingham, 11.30 a.m.

Sept. 10.—South Western G.C.C.: 34, Bridge Street, Taunton, 11 a.m.

Sept. 11.—Scottish Association of Gas Managers: Annual General Meeting, Barrfields Pavilion, Largs. (Golf and bowling competitions September 10; Wemyss Bay-Kyles of Bute excursion September 12).

Sept. 15.—Eastern G.C.C.: Connaught Rooms, Kingsway, W.C.2, 2 p.m.

Sept. 15-19.—Association of Public Lighting Engineers: Annual Meeting and Exhibition, Harrogate. Exhibition of public lighting equipment, Gas Council exhibit, Stand No. 9.

Sept. 16.—Irish Association of Gas Managers. Annual Meeting, Londonderry.

Sept. 25.—North Thames G.C.C.: Westminster City Hall, Charing Cross Road, W.C.2, 2.30 p.m.

Sept. 29.—West Midlands G.C.C.: Queen's Hotel, Birmingham, 2.30 p.m.

Britain has been allotted 195,000 tons of sulphur for the second half of this year, states the International Materials Conference in Washington. For the first six months the allocation was 194,000 tons. The total of 3,200,260 tons to be distributed by the Conference is 246,860 tons more than was available in the first half of 1952. Most countries actually obtained more than was originally granted them.

Peat will provide the power for a third of Ireland's new five-year electrical development programme. Schemes which will cost £22 mill., will more than double Ireland's existing power output, and will include a wide variety of different types of station. Three of these will be fuelled entirely with peat. They will be the only generating plants of their type in the world outside Russia, where the possibilities of peat have already been explored.

'No Confidence' in Consultative Council

A RESOLUTION recording 'complete lack of confidence in the present members of the South Western Gas Consultative Council,' and asking for the Government to set up appeal tribunals to hear complaints, and consider approval of price increases and terms of supply, has been passed unanimously by the Bristol Gas Meter Protest Commitee.

The Committee meeting followed the recent Bristol County Court case in which the South Western Gas Board claimed successfully from Mr. A. V. Blackburn, a Bristol ironmonger and Vice-President of the Independent Traders' Alliance, arrears arising from increased meter charges.

At the meeting a Bristol solicitor, Mr. L. Corbet Burcher, said of the Council 'It is our duty and business to make it as widely known as possible that although it has complied with the letter of the law, it is encroaching on our rights, and we intend to do everything legally proper, within our power, to keep that in front of the people.'

There are nine outstanding cases to be heard in the County Court, and Mr. Blackburn advised the persons concerned to pay the arrears for those quarters, but to continue to protest about future payment. He urged people not to buy their gas meters because by doing so, they would 'lose the only thing with which you can harass and worry the Board and the Council.'

Mr. Blackburn also produced figures, which, he alleged, showed that four meetings of the Consultative Council, with 23 members, cost £1,422, which averaged more than £15 per member per meeting.

Mr. Burcher said he did not think the Council represented the ordinary consumer to the extent of more than 2%.

The meeting decided to increase the number on its Executive Commitee and to extend its protests to the recent increase in electricity tariffs.

Lectures to Fitters

MR. G. L. FOSSETT, of 'Stotts of Oldham,' recently gave a series of lectures to the fitters, sales staff, and inspectors of the Huddersfield and Halifax groups of North Eastern Gas Board. Spending three days at each undertaking, he gave a three-hour lecture both morning and afternoon to groups of from 30 to 40 men, covering in this way nearly all the relevant staff.

To make his lectures the more interesting he had prepared a special 'lecture box' containing nearly all the valves and components which make up Stott water boilers, hotcupboards, steaming ovens, fish fryers and boiling pans. He also had with him three Stott water boilers—the B.W.O. Junior, the No. 1 Regula, and the famous Canteen 'Magna'—which he dismantled as he went along to make their working as clear as possible, reinforcing his points by reference to sectional diagrams. He talked not only about Stott appliances, but discussed every well-known make on the market. Gas fitters, he emphasised, whose technical knowledge had already won the consumers' respect, are just as important on the sales side as the salesmen.

Irish Meeting

THE programme for the annual meeting of the Irish Gas Association has now been published and foreshadows, as usual, an interesting and enjoyable gathering—on this occasion in the North under the Presidency of Mr. G. Walmsley, Engineer, Managing Director, and Secretary of the Londonderry Gaslight Company.

The meeting opens at 10.30 a.m. on Tuesday, September 16, at the City Hotel, Derry, when the members will be welcomed by the Mayor and by Captain B. F. McCorkell, Chairman of the Gaslight Company. Two papers will be presented: 'Continuous Vertical Retorts in the Irish Gas Industry,' by J. T. Bradshaw; and 'The Use of Butane in Small Gasworks,' by Dr. W. T. Crosby. After lunch members and their ladies will visit the Creggon Housing Estate and the gasworks, where tea will be taken. The annual dinner will be held at the City Hotel at 7.30 p.m.

The following day will be devoted to social activities—a tour, in the morning, of the 'Hills of Donegal' with lunch at the well-known Rosapenna Hotel. In the afternoon there will be golf on the Rosapenna course or, alternatively, a further coach trip round the 'Atlantic Drive'—which includes some of the most beautiful coastal scenery in these islands.

Cannon Sports

CANNON (HOLDINGS), LTD., held their annual sports on July 12 when over 1,000 visitors enjoyed the varied bill of fare provided by entries from a dozen departments, as well as by children of employees. Pillow fights, dourly contested, were very amusing and great energy was displayed by the tug-of-war teams. Bowls contests and the tennis finals were other popular items in a full programme.

The highlight of the day was a giant punch-ball match refereed by Bert Williams, England and Wolverhampton Wanderers goalkeeper. Quasi-Rugby tactics employed on both sides of the ball produced great hilarity.

Mr. A. F. Oatley, Chairman and Managing Director, presented generous prizes to the winners. Following a firework display dancing until midnight brought an enjoyable day to a close.

New Terms which the West Midlands Gas Board is introducing for street lighting were described by Mr. G. Bartlett at the local council at Penkridge last week as 'dictatorial' to local authorities. The Clerk, Mr. R. S. Caswell, said the Council would have to maintain the standards and lamps or pay the Board the cost of labour, materials and transport, plus 25% and the cost of replacing broken standards and lamps, plus 10%. He said: 'The Board is adopting this policy over the whole of its area, and we shall still be paying less than for an electric lighting scheme.'

Fifteen Stotts 'Regula' Café Sets were on duty in the refreshment tents at the Royal Show, Newton Abbott. They were installed in conjunction with the South Western Gas Board which laid a special gas main to the showground to feed them. Other Stott equipment included two boiling pans and a further 'Regula' café set on the Gas Council stand.

The Trade Statistics for May, 1952, just issued by the Central Statistics Office in the Republic of Ireland, show imports of 24,450 tons of gas coal, valued at £150,937, purchased from Great Britain. This brings the total of these imports for the first five months of 1952 to 122,024 tons, valued at £750,347, of which 116,801 tons, valued at £713,710, came from Great Britain.

PAINT FROM OLD BREWERY

THE many gas industry friends of C. R. Averill, Ltd., graphite refiners and industrial paint manufacturers, for many years operating from Duchy Street, London, S.E.1, just south of the Thames, will be interested to learn that they recently transferred their factory and head office to Caergwrle near Wrexham. Production commenced on July 7.

All the Company's administrative, sales and technical staff have been transferred from London. Labour requirements on the production side have been recruited from local sources for which a considerable number of applications has been received. The present factory formerly a brewery with walls 2 ft. thick, has been easily converted, though some alterations were necessary to the floor levels. The old forge in the brewery has been reconstructed to form a new laboratory.

The building is ideally suited for the firm's two major commitments; the grinding and refining of graphite, and the manufacture of industrial paints, which will be carried on in two separate parts of the building. The firm's production includes silica graphite paints used on steelwork to prevent weathering and—in addition to industrial paints—lubricating graphites and graphite grease joint compounds.

The factory is now more conveniently sited for the receipt of graphite imports, which come from Liverpool, and for a large part of its business, which is conducted in the industrial north. Liverpool will also be a more convenient outlet for the export trade. The full address of the head office and works is:—C. R. Averill, Ltd., Alyn Mills, Caergwrle, Wrexham, N. Wales (Tel.: Caergwrle 14). The new London Office is at 52, Bedford Row, W.C.1. (Tel.: Holborn 5113).

Gasworks Standard in West Midlands

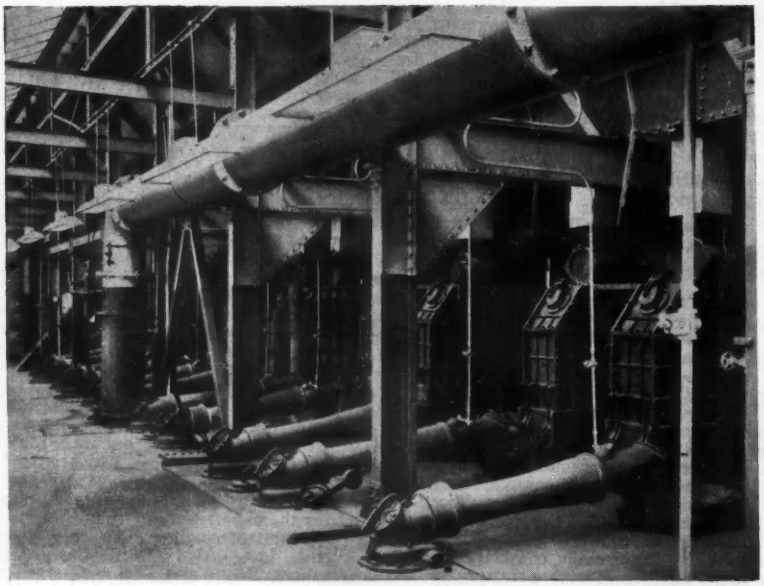
Example in New Tipton Retort House

Inauguration of the new retort house at the Tipton works of the West Midlands Gas Board on July 16 is of special interest for two reasons. The new building and plant set the standard of what gasworks should be in the area; and the establishment of the new retorts was due to the initiative of the Tipton Council whose plans were made at a time when nationalisation was pending but who notwithstanding went ahead with the scheme.

IN bright summer weather on the morning of July 16 guests gathered at the Tipton gasworks for the inauguration of the new retort house. The visitors included the Mayor of Tipton, Alderman A. E. Bolton, J.P., C.C., and members of the Tipton Council, Mr. G. le B. Diamond (Chairman of the West Midlands Gas Board), Mr. A. W. Lee (Deputy Chairman), Mr. F. H. Cureton (Secretary), Mr. Fras. C. Briggs (Divisional General Manager, Wolverhampton), Mr. J. E. Wakeford (Divisional General Manager, Birmingham), Mr. C. F. W. Rendle (Divisional General Manager, Worcestershire and Hereford), Mr. F. P. Dyson (Director, Woodall Duckham), Mr. A. H. Cowan (Director, Drummond Patents-Holdings, Ltd.), and Mrs. Councillor Dale (Chairman of the Consultative Council's Wolverhampton division).

The guests proceeded to the new retort house where the Mayor inaugurated the plant by tipping a truck of coal. The various parts of the retort house were inspected. The number of panels and the completeness of the system for recording and registering purposes was commented on as well as the cleanliness secured by the permanent installation for suction cleaning. Much interest was also shown in a new surgery completely equipped near the entrance.

Following the tour of the works luncheon was provided at the invitation of the West Midlands Gas Board at the Royal Oak Hotel, Dudley Port.



The retort house charging stage, showing the auxiliary coal hoppers and crude gas offtake pipes.

Mr. DIAMOND proposed the toast of the Corporation of Tipton. On behalf of the Board he expressed appreciation of the support given by the Mayor and members of the Tipton Corporation at the inauguration of the new carbonising plant. The credit for the inception and the ordering of the new plant belonged to the Corporation of Tipton, for considerable foresight was shown at a time when hesitancy might well have been excused. The nationalisation of the gas industry was impending at the time when they embarked on a scheme for a substantial extension of their gas making capacity and while there were many local authorities and privately owned undertakings imbued with the same public spirit and enterprise who took a similar course, there were some who did not. They, in some places, had given the Board a considerable headache but there was no headache at Tipton. They went ahead with their scheme and they had seen the fruition of it that day.

Every Amenity

Those who had visited the works had seen what a first rate carbonising plant should be, well organised, with plenty of air and space to give comfortable conditions, well found in every respect with dust extraction plant to prevent atmospheric pollution, together with mess room and washing accommodation. There was every amenity to make the working conditions of the plant satisfactory and they had seen a pattern for the standard which the West Midlands Gas Board set up for every works under its care. They had in mind not only the welfare of their employees, which stood very high, but above all service to the consumer. They were public servants first and they could only give satisfactory service to the consumer if they had first rate plant and equipment, competent operatives, and satisfactory conditions.

He paid a tribute to the Woodall-Duckham Company for the efficient way in which the contract work had been carried out; they had done a first-class

job of work, and they should also congratulate the other contractors who had been associated with them in producing a first rate establishment. He ventured to think that the architectural design of the new buildings would be found to be pleasing and that it would be a notable addition to the industrial buildings in that important area.

They were glad to see Mr. Dyson present, and Mr. Johnston, of the Ministry of Fuel and Power, but it was a matter of regret that of their own members Alderman Hodgkinson and Alderman Schragg, were unable to be with them.

Normally the inauguration of an up-to-date plant of that description would have been the first step towards a reduction in the price of gas, but under the conditions of today any increase in thermal efficiency which might follow from the operation of the new plant had already been swallowed up in the enormously enhanced capital costs and by the general inflationary spiral in which they had been entangled for some years. Since vesting day, for example, the Board had had to meet additional costs, imposed by outside agency and through no fault of its own, to the extent of £3,500,000 net. Coal alone cost £1,435,000 more than it did on May 1, 1949.

Early in his engineering career he became aware that the Borough of Tipton was the headquarters of famous firms in the engineering industry. He also knew that one of Boulton and Watt's first pumps was installed in or near Tipton and was still working as recently as the 1920's, a monument to the skill and enterprise of the craftsmen who made it.

The industrial revolution which swept over that area did very much for the prosperity of the country as a whole in happier times and no doubt it sustained them mightily during two world wars, but regrettably it left its scars.

The Mayor of Tipton, responding, acknowledged the tribute which Mr. Diamond had paid to the corporation for their initiation of that scheme. He had been a member for 27 years and a member of the old gas committee from its inception. He remembered the time when there was an overdraft at the bank but through the hard work of the engineer, the late Robert MacFarlane, much progress was made and the price of gas was brought down so that they were providing it at a cheaper rate than any other undertaking in the area, not excepting Birmingham. So they were able to hand over an economic and efficient undertaking. He was proud that the corporation was responsible for the inception of the scheme the results of which they had seen that morning.

The New Plant

The new installation comprises a bench of 22 82-in. major axis Woodall-Duckham continuous vertical retorts with a total throughput of 165 tons of coal per day and a total gas make of 3 mill. cu.ft. of 450 B.Th.U. gas per day. Provision has been made for an additional six retorts for which an order has been placed.

The retorts are about 26 ft. high, rectangular in plan, and tapered to allow easy descent of the coal. They are fitted with standard Woodall-Duckham coke extractors and water-sealed dischargers from which the coke is discharged dry and cool. A feature is the dust extraction plant which removes the coke dust emitted during the discharge and prevents atmospheric pollution.

To supply the gas for heating the retorts a battery of five Woodall-Duckham step-grate producers will eventually be provided at the side of the bench and at ground level. Any four producers will be capable of heating the completed bench of 28 retorts and the battery has been designed so that any producer may be shut down without interfering with the working of the others.

The coal for the new installation is delivered by rail, the coal trucks being tipped by a 20-tons capacity side discharge wagon tippler into a 30-tons capacity coal receiving hopper. From this hopper the coal is fed by a rotary feeder into a single roll coal breaker complete with hinged screen and by-pass chute for by-passing the smalls or, alternatively, completely by-passing the breaker when consignments of small coal are being handled. From the breaker, in which the large coal is reduced to 3½ in. cube, the broken coal, together with the small coal by-passing the breaker, is fed on to a 30 in. belt conveyor which in turn delivers the coal on to the bottom strand of either of two lip bucket conveyors encircling the retort bench on its longitudinal axis, one of these conveyors acting as a standby. From the top strand of either conveyor the coal is dumped into the overhead coal storage hoppers above the bench. From these hoppers, which have a capacity of 48 hours usage, the coal is fed through rotary valves into the auxiliary supply hoppers attached to the top mouthpieces of the retorts. This coal handling system has a capacity of 65 tons per hour.

Coke Handling

Beneath the retorts a travelling coke chute receives the coke from the water-sealed dischargers and delivers it on to the bottom strand of either lip bucket conveyor. Run-of-retort coke for the producers and for filling the retorts after scurfing is discharged from either lip bucket conveyor into an overhead storage hopper of 12 hours producer fuel capacity. From this hopper coke is fed by individual chutes to the producer charging and retort-filling skips, both of which are top-hung and hand-propelled. An automatic weigher has been provided for weighing the fuel taken to the producers. The coke for sale is discharged from the top strand of either lip bucket conveyor on to a 24 in. belt conveyor which delivers this coke to the existing screening and storage plant at a rate of 15 tons per hour. The lip bucket conveyors are of the two-speed type for handling coal at a rate of 65 tons per hour, or coke at a rate of 15 tons per hour.

A horizontal fire-tube induced draught waste heat boiler, with a working pressure of 120 lb. per sq. in., deals with the waste gases from the bench. The boiler is provided with two induced draught fans, one forming a standby, one fan being driven by a steam turbine and the other by an electric motor. A superheater is fitted, capable of adding a superheat of 50°F. There are two vertical direct-acting feed water pumps, one acting as a standby. The steam produced from waste heat is adequate for the requirements of the plant and gives a small surplus.

Instruments have been provided to give the basis for technical control. Automatic regulators have been installed, where appropriate, to control the operation of the plant and to ensure a continuance of the most efficient operating conditions. The new installation is housed in a steel-framed building faced with brickwork to give a flush external face, and has special architectural features, including brick towers to enclose the chimney and electric lift.

Within the retort house, separate rooms are provided to accommodate the extractor engines, liquor pumps, lift motor, and main switchboard; the walls of these rooms are lined with white glazed tiles. Messroom and washroom accommodation is also provided within the retort house at top of setting level, complete with showers, lavatory basins, etc. Dust extraction and vacuum cleaning plants are provided within the house to ensure the best possible working conditions for the operators.

Visitors saw being installed a plant for the concentration of ammonia liquor. When this plant comes into operation, the effluent liquor produced will be considerably less toxic than raw liquor, which will reduce the difficulties of disposal. Two additional deep purifiers are in course of construction to deal with the extra make of gas from the new carbonising plant.

A well-equipped works surgery has recently been opened in connection with the Board's medical services, and other amenities for the employees in course of construction include a new kitchen, lavatories, etc.

Many items of plant in use at the works were fabricated locally. These include all the gasholders, the cast-iron purifiers and works steam boilers.

Tottenham's Long Service

REMARKABLY long service records were disclosed in the Tottenham division during the presentation of certificates to employees to mark the completion of 25 years' service.

In all 599 qualified for a certificate and their total years' service amounted to 19,393, made up as follows:—

Tottenham, 533 employees, 17,243 years' service; Barnet, 33 employees, 1,071 years' service; Bishop's Stortford, 33 employees, 1,079 years' service. Of these, several had served the gas industry for well over 40 years and the average for the division was 32.4 years.

The presentations were made personally by the General Manager, Mr. F. T. Brookes, who, on behalf of the Board, expressed congratulations and good wishes to the employees.

Consumers' Councils Welcome Improved Coal Position

But Coke Prospects are Uncertain

THE fifth annual reports of the Industrial and Domestic Coal Consumers' Councils, printed as one Stationery Office 9d. pamphlet, were published on July 9. Both refer to the improved situation compared with last year, but the Industrial Council again emphasises the importance of fuel efficiency as a means of releasing more coal for export, and the Domestic Council urges that in providing the domestic consumer with adequate supplies of clean fuel of reasonable quality the country would be making a sound investment.

The Industrial Council refers to the serious concern which it felt at the time of the submission of its last report a year ago when inland consumption was rising faster than production and there was a risk of supplies for industry falling short of requirements. In the event its fears of fuel scarcity for industry, for a variety of reasons, proved groundless. Indeed in the early months of this year the Council thought that in view of the satisfactory stock position of industry, which had been achieved despite a curtailment of the million tons or so which it had been proposed originally to import during the winter, increased exports of coal might begin at an earlier date. In this connection the report notes the Government's decision that exports over the whole of 1952 are to be increased by 4½ mill. tons.

Margin Still Fine

The Council says that although the immediate outlook for industrial supplies is better than for years past, the margin is still extremely fine and the Council is concerned lest at any time there should not be enough coal to meet the expected requirements of all industrial consumers in full. It urges therefore that there should be no slackening of effort on the part of all involved to improve the position still further. It also stresses that if at any time the outlook should so deteriorate that there has to be some limitation of supplies to inland industrial consumers below what they expect to require for the unrestricted operation of their plants or processes the longest possible notice should be given so that appropriate action can be taken by them to minimise damage to the national economy.

The Industrial Council describes the procedure followed by the National Coal Board in creating the new coal price structure introduced last December. From its earliest days the Council has been anxious that coal prices should be put on a rational basis and it has constantly protested at the device of 'flat rate' increases, applied without discrimination to all qualities of coal, as while such a method is convenient and easy to apply, it results in relative prices for different coals being out of harmony with their comparative values and bears unfairly on some consumers.

Price Rationalisation

The process of rationalising prices has been undertaken by the National Coal Board in stages, the latest and most significant being the introduction of the new price structure last December. In the first instance all coals normally used for industrial or carbonisation purposes were placed in either an industrial or a carbonisation category, according to what the Coal Board considered the primary use of each coal. The value of each coal was assessed initially by means of formulæ covering the main characteristics of the coal. The formula for industrial coal was based mainly on heat content as measured by the gross calorific value 'as received,' but the Coal Board recognised that high ash content is a nuisance and introduced ash penalties which have the effect of reducing the price as the ash content rises.

Adjustments for Ash

The formula for carbonisation coals also took account principally of the calorific value of the coal but weight was given to gas and coking properties. Secondary adjustments were made as the Board thought necessary for ash in coal and ash in the resultant coke. By means of these formulæ industrial and carbonising coals were put separately in orders of merit which were then aligned so that coals of a given rank which are used for both carbonisation and steam raising were valued approximately the same. Adjustments were made where appropriate in respect of sulphur content, size distribution, etc., and the procedure resulted in a large number of individual prices differing from one another by only a few pence and so the Board thought it would be advantageous to put all the coals into a small number of clearly defined price groups. Group prices were established with a differential of 1s. 7d. or 1s. 8d. between the price of each group.

The Coal Board added different amounts for various coalfields, calculated to produce in a rough and ready way such pithead realisations as might have been expected if the Board had been able to co-ordinate at the point of delivery the price of industrial and carbonisation coals in a commercial way.

Gas Council Dissatisfied

Referring to the dissatisfaction felt by the Gas Council and other sections of the carbonisation industries with the principles adopted, the report says the National Coal Board advised the Council that it had tried to meet the views of the carbonisation industries by modifying the proposed evaluation of carbonisation coals substantially, to remove the apparent injustice to those industries. But that did not satisfy the carbonisation industries, their contention being that the relative values of coals could only be measured by a single standard and therefore the N.C.B. was wrong in using different standards according to the purpose for which the coal was primarily used.

There was strong difference of opinion among the members of the Council as to whether the complaints were justified. Certain members took the view that the N.C.B. had acted in an arbitrary manner. Some of them contended that the scientific assessment of value of all coals should be based on calorific value subject only to minor adjustments, whether the coal was sold for heating or any other purpose, and that the average realisation of domestic coals at the pithead, under the zone price scheme adopted for domestic coals, should not be less than the pithead price of the same coal when sold for carbonisation purposes.

New Structure Approved

The Consumers' Council realised that if the N.C.B. were to comply with the wishes of the carbonisation industries the whole of the price structure would have to be altered and it would be necessary to re-open the discussions which the N.C.B. had had with representatives of other categories of consumers. In such an event there would be strong opposition from other consumers who would be called on to pay more for their coal than under the price structure adopted by the Coal Board. On a vote, from which the Coal Board members abstained, a majority of the Consumers' Council approved the new price structure.

The Industrial Consumers' Council says there is a great deal of uncertainty as to the adequacy of supplies of coke to meet future needs, and importance is therefore attached to the co-ordination of the plans of the different sections of the carbonising industries to cope with inland and export demand. A year ago the Council suggested that it would be an advantage if a comprehensive statement could be prepared giving a summary of the expected productive capacity of all coke producers over the next few years in relation to the demand for hard and gas coke. While appreciating the difficulty of making forecasts the present report says it is important that an agreed statement of the expected capacity of both the coke industry and the gas industry over the next few years should be made available as soon as possible.

Domestic Position

The report of the Domestic Coal Consumers' Council makes it clear that the comparatively mild weather last winter was one of the main factors in averting what could have been a disastrous situation for domestic coal consumers. The Council expresses the view that many domestic consumers themselves were responsible to an appreciable extent for the more favourable position because they held their summer purchases in

reserve for the coldest months and practised economy wherever possible. The special restrictions on deliveries, the efforts of the miners, and the co-operation of the consuming public all helped the country through an anxious time.

Referring to the need for adequate fuel supplies for domestic consumers, the Council points out that while it is true that many householders increase their use of gas and electricity when they are without solid fuel, this is poor compensation for the shortage of coal; 'it is not a desirable expedient to which to have to resort and may be to the detriment of industry.' Moreover it must not be overlooked that many people are entirely dependent on solid fuel for cooking and heating; it is their only fuel and the increased use of gas and electricity during times of shortages penalises those consumers even further, since extra coal is being used to provide those other means of heating.

The importance of summer stocking is again emphasised. Dealing with coke and other boiler fuel the Council says the installation of improved solid fuel burning appliances tends to accentuate the demand for these fuels, and this adds force to the call for better distribution so that whatever the type of appliance a householder may have some greater assurance than he has known in recent years that he will have an adequate supply of whatever kind of fuel he needs to give reasonable service and so justify the expense incurred in installing an improved appliance. The Council is glad that merchants are looking into the possibility of keeping a record of their customers' solid fuel appliances so that supplies may be more fairly distributed.

In its conclusions the Domestic Coal Consumers' Council recognises that special arrangements for priority deliveries of coal are 'admirable and of real benefit to those genuinely in need,' but says there is a certain amount of worry and anxiety attached to making such applications and apprehension as to whether they will be granted, which would be obviated by a more generous allocation in the first instance. In the Council's estimation boiler fuel is equal in importance with house coal and the Council welcomes the steps that are being taken to effect a better distribution, especially in the south; it hopes that with the better service will come a more adequate supply of this essential fuel.

Publications Received

CORRECT planning and reliable appliances, which facilitate rapid service and a quick turn-over of custom, are an essential in any catering establishment, but especially so in those which form the subject of No. 5 in the Gas Council's 'Commercial Uses of Gas' series, *Cafés, Tea Rooms and Milk Bars* (price 2s. 0d. post free).

This well-produced booklet describes not merely the variety of gas appliances suitable for such establishments—ovens, water boilers, heaters, refrigerators, boiling tables, etc.—but also devotes special attention to the correct planning of the accommodation, so that the best use may be made of the available space. Stress is laid upon the importance of cleanliness and of correct heating and ventilation, on health grounds and to comply with laws and bye-laws. The use of gas equipment as an aid to cleanliness and hygiene—as, for instance, in the use of the sterilising sink—is emphasised.

The publication is likely to prove of considerable interest, particularly to architects, for whom it was specially prepared, and to those engaged in the catering trades.

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The latest of the series of research studies sponsored by the Research Committee of the Institute of Municipal Treasurers and Accountants into everyday problems of local government and public board finance has been published under the title of *Wages Records of Local Authorities and Public Boards* (20s. from 1, Buckingham Place, S.W.1). Founded on replies of financial officers of 109 local authorities and public boards to a questionnaire sent out by the Institute in 1950, it covers all aspects of wages preparation and has chapters devoted to procedures prior to payroll preparation; manual, accounting machine, and punched card systems; national insurance contributions; the check of wage records in the finance department; payment of wages; bonus schemes, and general conclusions. The investigators found a bewildering diversity of practice and they concluded that because of widely varying circumstances what is good practice for one is not good practice for all. The cost of the best practice may in some cases be so high as to be uneconomic. The variety is in itself neither good nor bad, they say, but when there are several good ways of doing any job it is important to decide which is the best, and it seems to the authors that many authorities might well examine their methods of wages preparation and payment with a fresh mind.

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From the Sir John Cass College we have received a copy of the prospectus for the 1952-53 session. Details are given of the wide variety of subjects in which courses are available—from botany to brewing and from metallurgy to mural decoration. There is, indeed, practically nothing one cannot take a course in at the Sir John Cass College. The prospectus, which also contains particulars of fees and enrolment procedure, is obtainable from the College at Jewry Street, Aldgate, E.C.3.

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The conference group system of management development and training has become an effective feature of modern industrial organisation and experience has shown that the benefits to be derived from conferences more than compensate for the time they take. The National Institute of Industrial Psychology, which has consistently encouraged the conference system, has published a 28-page paper, *Conference Leading* (N.I.I.P. Paper No. 4, 2s. 6d.), which offers valuable guidance on the rôle of the leader, the planning of the conference, the conduct of discussion, and the use of the conference group system in a formal training programme. The author, Miss E. C. Livingstone, M.A., says the success of the system depends largely on the skill with which conferences are led. Discussion can be a frustrating as well as a stimulating activity, and the conference that is badly handled can easily do more harm than good. Conference leading, like holy matrimony, is something not to be entered upon lightly. It is, however, a field in which skill can be acquired if the leader brings the right attitude of mind to his task.

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The Institute of Municipal Treasurers and Accountants' *Return of Education Statistics, 1950-51,* relates to the education service of county boroughs and the County of London and is the third of its kind issued by the Institute's Research Committee. Comparison with figures for the previous year shows an all-round increase. The average net rate and grant borne expenditure per 1,000 of the population went up from £5,489 to £5,725. Total net rate and grant-borne expenditure increased from £93,676,091 to £97,514,464, of which £55,313,731 was met by grant against £53,587,961. The number of pupils on school registers, including assisted secondary schools, rose from 2,278,432 to 2,320,019.

* * *

Site Records for Builders—Programming and Progressing for Traditional House Building (Stationery Office 3s.,) amplifies the material in previous Ministry of Works booklets dealing with various types of building and civil engineering contracts, and should be of assistance to architects, builders, and their supervisory staffs in the drive to improve housing production. The first part outlines five alternative methods of programming and progressing. One method shows how the progress of a contract as a whole can be watched by checking the rate of expenditure against that estimated and in this way form a link between the physical progress and the financial records. Part II deals with the programming of the work where heavy mechanical plant is employed and Part III deals with the operations and units of measurement found to be suitable to programming, costing, and bonusing of the work, all of which are closely related. Although the examples given are for housing contracts, many of the principles described apply to other kinds of building.

AMERICAN SPOTLIGHT

Items of Topical Interest from the Contemporary Technical Press of Canada and the United States

WOODEN PIPE RELIC

BURL S. WATSON, executive vice-president of Cities Service Co., has presented a section of one of America's first wooden natural gas pipe lines to David H. Moskowitz, assistant superintendent of New York City schools. Presentation of this historic relic, to be exhibited to New York school children, was made at Cities Service headquarters in New York.

Dug up after 60 years underground, this piece of pipe was part of a line running from a gas producing well in West Bloomfield, to Rochester, N.Y., a distance of 25 miles. Cities Service Co. found on excavating the pipe, made of Canadian white pine, that it was still in excellent condition.

The pipe is a fine contrast to the modern 32 in. steel carriers which transport natural gas from the south-west to the east, and it provides an example of early efforts by the industry to transport products. Cities Service still has producing gas wells in this area. (*Gas Age.*)

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MISSISSIPPI CROSSING

WHEN talk turns to the toughest job in laying pipe line, construction men will tell you without hesitation that its a river crossing. And the toughest of all is claimed to be the laying of three separate lines of 20-in. pipe across 3,000 ft. of unpredictable river from Grand Tower, Ill., to Wittenberg, Mo. —the last link in the 1,340-mile line carrying 524 mill. cu.ft. from the Texas gas fields to the Chicago area.

The construction had to contend with abnormally high waters and river current all the summer, and with the coming of winter, ice ranged down the channel to make the work even more hazardous. First task was to dredge a path 20 to 40 ft. deep and 200 ft. wide across the bed of the Mississippi. Next, 40-ft. lengths of pipe were cleaned, primed, and coated with an anti-corrosion covering of fibre glass, felt, and bitumastic enamel heated to 478°F., and covered with wood mats for protection in handling. The pipes were then welded into sections 1,500 ft. long and set on tiny cars on a railroad track. A watertight plug was welded to the leading end, which, incidently, was broken off on the first length by the pitching motion of a barge when it was two-thirds of the way across. The constructors moved the length a few feet up river and put a second pipe across, which went over without mishap.

In midstream lay the 'G. A. McWilliams,' her spuds down solid in the river bed. On the two drums of her stern anchor winch was reeled about a mile of 1¼-in. wire cable with a breaking strength of 69.45 tons. The cable end led out over the sheave of a derrick to the pipe on the shore. The cable was passed through a hole in the steel cap on the pipe end and a purchase taken on the pipe. When the order to 'heave' came over the two-way radio, the pipe sections was pulled halfway across the river. After the first pull, a 1,000 ft. section of pipe was welded on to the first section and the second pull was made. A third pull was made with a 500-ft. section, completing the 3,000 ft.

Handling the heavy pipe on land, where it weighed 200 lb. per lineal foot, was done by side boom traction using wire rope or belt slings. Every now and then the pipes ashore had to be hoisted into the air to let trains of the Illinois Central railroad pass underneath. A total of 270 men formed the crews for the crossing. (*Gas Age.*)

* * *

KITCHEN HEATER RANGE

THE occasions when the independent heating of a kitchen is necessary are probably comparatively rare in this country. With the extremes of temperature experienced in America, however, coupled with the fact that central heating or hot water boilers, which normally find their place in the kitchen of British homes and provide all the necessary warmth therein, are more often sited elsewhere in American houses, make some form of independent kitchen heating desirable.

To meet this need a firm of gas range manufacturers, the Hardwick Stove Co., of Cleveland, Tenn., has developed a range of which a heating unit is an integral part. The heater, which is equipped with room thermostat and automatic pilot, is entirely contained within the unit and throws out warm air through a grill in the left-hand side of the range. (*Gas Age.*)

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GAS SERVICE GUIDE BOOK

CUSTOMERS of Portland (Oregon) Gas and Coke Company are probably among the best-informed householders as regards getting the greatest enjoyment and use from their gas service at the lowest possible cost.

Each of this utility's 100,000 customers has been given a copy of 'Your Gas Service Guidebook' along with a letter explaining its value and use. It is a book of facts. It tells how the gas meter works, how bills are figured, how the home service department can assist, and how appliances are adjusted, with a summary of their principal features.

The customer is invited to read the guidebook thoroughly and for further information is invited to mail in the postage-paid question form card which is part of the back cover. The booklet is attractively printed in three colours and effectively illustrated. (*A.G.A. Monthly.*)

NEW FRYER TRIPLES OUTPUT

TECHNIQUES for advanced deep fat fryer design, tripling the amount of useable heat commonly available for frying, are presented in a new research bulletin by the A.G.A. laboratories.

Many existing gas fryers operate with loads having a fat-to-potato weight ratio of 8 to 1 with cycle times averaging 10 to 12 minutes. By comparison the experimental fryer used in developing the new equipment achieved a 6 to 1 ratio with a 4½ minute cycle time. A complete cycle comprises frying time plus recovery time for the fat to return to starting temperature.

Useable heat obtained in the experimental fryer achieved a value of 1,500 B.Th.U. per lb. of fat, compared with a value of 1,000 to 1,350 B.Th.U. in many current designs of fryer. In one bench test 77 lb. of potatoes per hour were produced in a single step frying. In two step frying, the capacity of the fryer to brown potatoes in the final stage may be as high as 300 lb. per hour, or enough to serve 600 persons per hour. (*A.G.A. Monthly.*)

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LIGHT FOR THE BLIND

GAS has taken its place as a leading fuel, while relinquishing its rôle as an illuminant. Yet one gas utility brought light of a sort into lives that need it sorely. Pioneer along this avenue was the Consumers' Gas Company of Toronto, which successfully conducted cooking classes for blind women. The course, which included food preparation, nutrition, care and use of kitchen equipment and many aspects of home making, was presented by the home service department, in conjunction with the Canadian National Institute for the Blind. Classes for approximately 30 women of varied ages were held twice weekly for 12 weeks.

It comes as a surprise to many that blind women cook, and do it very well. But aid can be given in helping a blind woman feel at home with a gas range. For top-of-range cooking, the blind can determine immediately when the flame is on and when it is off. There is no guesswork, with the result that blind women show confidence when using a gas range. Oven rack placement, taught when the oven is cold, is a simple matter. By counting the oven rack guides from the bottom up and learning rack positions, these women doubtlessly do a better food placement job in the oven than many of their sisters who can see. Detail is most important to them.

The oven heat control and the timing dial have a type of Braille marking, which made temperature setting easy. (*A.G.A. Monthly.*)

Abstract of Comm. No. 410

Gas Manufacture in the Eastern Area

by

E. O. ROSE, B.Sc., M.Inst.Gas E., A.M.I.C.E.,

Engineer, Tottenham Division, Eastern Gas Board.

THE delivered cost of coal, per ton, for the main centres of gas manufacture in the Eastern area varies considerably. The price for Durham coals at Lowestoft is unduly high on account of the high cost of discharging under present conditions. If a new works was developed, as is proposed, in that locality, it would be erected on the waterside, and the Board would undertake its own discharging. The cost would then be comparable with that at Yarmouth or even less. The cost of Yorkshire nut coal varies between 82s. 5d. per ton at Peterborough and 95s. 10d. per ton at Chelmsford. If carbonised in continuous vertical retorts to produce gas of a calorific value of 500 B.Th.U., the difference in cost of coal between these two extremes represents 2.15d. per therm.

The range of Durham prices is from 85s. 9d. per ton at Yarmouth to 94s. at Southgate. Carbonised in intermittent vertical chambers, the difference represents 1.42d. per therm.

Dealing with the matter division by division, in the Tottenham division Durham coals are undoubtedly more advantageous than those from Yorkshire. It has been the practice at Tottenham to carbonise about 40% of Yorkshire coals in continuous vertical retorts in order to assist the development of the local domestic coke market. This, as is shown in Fig. 1, is now considerably more expensive as a method of gas production, while the resulting coke has to be disposed of to merchants at the same price as the fuel, less desirable for domestic purposes, derived from Durham coals in intermittent vertical or horizontal retorts.

In the Watford division, the whole of the coal carbonised comes from the Yorkshire or East Midland fields. The rail routes from the London Docks are indirect and the rail charges consequently high. There is, therefore, no advantage to be gained from carbonising other coals even if they were available.

The Cambridge division is the most fortunately placed in so far as Yorkshire and East Midland coals are concerned, and there is no choice of coal other than that used at present. King's Lynn, on account of the shallowness of the Wash, is not a satisfactory port, and there is no question of centralising manufacture there.

Wide Extremes

The Ipswich division suffers from the widest extremes. Both Ipswich and Colchester are available to small vessels, and the works at these two places carbonise only seaborne Yorkshire coals. The towns inland, dependent upon rail facilities, pay anything up to 11s. per ton more for the same class of coal. Here there is an indisputable field for the development of centralised manufacture based upon these two ports.

The Norwich division again is subject to a wide variation in prices. Yorkshire coals are carbonised throughout, except at Yarmouth and Lowestoft where Durham coals only are used. In the west of the division, the undertakings, with the exception of King's Lynn, are very small and widely separated. Norwich receives Yorkshire coals both by rail and by water, trans-shipment in the latter case being carried out at Yarmouth. The seaborne coals are 2s. 1d. per ton cheaper on equal qualities. There is a cluster of small works in the north-east of the division around Cromer, and a number of smaller works, more widely spaced, in the neighbourhood of Lowestoft. Both these groups offer fields for future integration. Both Yarmouth and Lowestoft are deep-water ports.

As a contrast to the wide variation in coal prices, due to the varying length of railroad hauls and the existence or otherwise of deep-water ports, attention should here be drawn to the price structure for the distribution of gas oil in the Eastern area. London is the oil port from which the whole of the Eastern area is supplied. The prices are:—

	Pence per gal.
Within an approximate radius of 15 miles ...	13·625
Between 15 and 40 miles approximate ...	13·875
Beyond 40 miles	14·125

These include delivery by road to site, and are independent of quantity.

The Problems of Each Division

Each division has its own local problems. Some of these may be due to lack of foresight or of resources on the part of the previous owners; others may be due to expanding industry or housing, or may arise only as advantageous possibilities resulting from nationalisation. The solution of all these problems entails the investment of capital and the use of raw materials. The view that must be taken of every problem must, therefore, be coloured by the known restrictions in these fields.

As soon as it becomes necessary to set priorities for capital investment, it is found that the projects competing for preferment fall mainly into four classes as follows:—

(1) Reconstruction that is imperative by reason of dilapidation of existing plant.
(2) Development to meet a newly arisen demand that cannot be properly refused.
(3) Development designed to save operating costs or fuel.
(4) Development to attract new business.

In a free economy it was held that all these forms of investment were legitimate, provided that the revenue produced was sufficient to meet the charges on capital. Under the restrictive conditions prevailing at present, and likely to continue far into the future, curtailment must be made, and the fourth category is the first to be eliminated. The first three categories remain, each making equally forceful claims upon the diminished resources. The first two categories will not admit of a negative answer, but if they are allowed to monopolise the whole field to the exclusion of the third the whole of the development work undertaken descends from the level of conscientious planning to that of mere shuffling and expediency.

A study of the situation, bearing these aspects in mind, can only lead to the conclusion that, of the many alternative solutions that may offer themselves to any problem, preference should be given to that solution which, other things being equal, involves the least initial capital expenditure.

The particular problems of each division are dealt with separately below:—

Tottenham

Broadly speaking, there are no fundamental problems of manufacture to be solved at Tottenham. The three inner works of Tottenham, Ponders End, and Southgate supply into one common distribution system, and their daily operations are fully integrated. Barnet and Hertford are sufficiently linked to allow marginal quantities of gas to be passed in both directions, and the same applies to Bishop's Stortford to a lesser degree. The only works virtually isolated are Epping and Thaxted. The latter is the smallest works in the area, having an output of under 3 mill. cu.ft. per year. It is expensive for gas-making, but is in good condition.

The output of the Tottenham division is increasing at a rate equivalent to 1.5 mill. cu.ft. per diem each year, and the main problem is to keep pace with development and, if possible, to gain sufficient lead to enable the smaller and less efficient works at Epping and Hertford to be closed down.

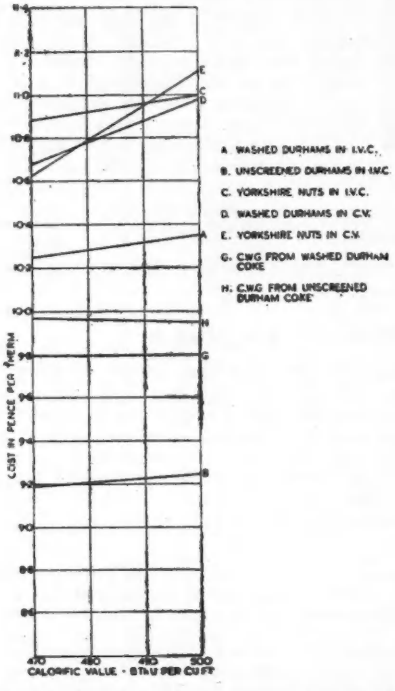

A. WASHED DURHAMS IN I.V.C.
B. UNSCREENED DURHAMS IN I.V.C.
C. YORKSHIRE NUTS IN I.V.C.
D. WASHED DURHAMS IN C.V.
E. YORKSHIRE NUTS IN C.V.
G. C.W.G. FROM WASHED DURHAM COKE
H. C.W.G. FROM UNSCREENED DURHAM COKE
COST IN PENCE PER THERM
CALORIFIC VALUE - B.Th.U. PER CU.FT.

Fig. 1.—Graph showing cost of manufacture at Tottenham including capital charges on the basis of 100% load factor.

The costs given in Fig. 1 show the relatively low cost of carburetted water gas, especially in relation to gas made from Yorkshire coals. The major extensions in this division will, for some time to come and unless prices alter considerably, be in the form of large water gas units.

Watford

The position of the Watford division in regard to the supply of gas is discussed in detail in a paper by Mr. W. A. Evetts.* It is there shown that, in general terms, an additional manufacturing capacity of approximately 20 mill. cu.ft. per diem will be required in the northern half of the division.

Consideration has been given to the cost of manufacturing half this quantity in the Tottenham division, and a comparison has been made between the cost of doing this and that of establishing a new works on a site somewhere between Welwyn Garden City and Hitchin. A main, laid from Ponders End to Welwyn Garden City, a distance of 15 miles, would transmit this gas at an overall cost of 0.40d. per therm. Assuming that no additional Durham coals were made available to manufacture this gas at Tottenham, and that Yorkshire coals would be carbonised in either case, the cost of supply from Tottenham, above that of local manufacture, is estimated as follows:—

		Pence per Therm
Gas transmission		0·40
Coal, increased price at Tottenham		0·05
Coke transport back to Watford division		0·67
		1·12
Less: Saving in capital charges on account of existing coal-handling plant at Tottenham	0·20d.	
Saving in effluent disposal at Tottenham	0·10d.	
		0·30
Net increase at Tottenham		0·82

If unscreened Durham coals were available in sufficient quantity to cover the manufacture of this gas at Tottenham, this net increase of 0.82d. per therm would be turned into a balance of 0.37d. per therm in favour of manufacture at Tottenham.

This case forms an example of the manner in which the whole course of development can be affected by the availability, or otherwise, of coal from a particular source.

Norwich, Cambridge, and Ipswich

The nature of the problems of these divisions arises from the large number of small works, the inefficient nature of the plant installed in many of them, and their inadequacy, in many cases, to take increased loads. The proposals put forward independently by each of these divisions are shown in Figs. 2 3, and 4.

The proposal for the Cambridge division is shown in Fig. 2 and consists essentially of a series of linkages based on three

Fig. 2.—Existing and proposed linkages, Cambridge Division.

* EVETTS, W. A. 'The Technical and Economic Aspects of the Gas Supply to Four New Towns.' *Inst. Gas Eng. Comm. No.* 409.

main manufacturing stations at Cambridge, Bedford, and Peterborough, with lesser stations at Wisbech and Saffron Walden. The first step in a scheme such as this is to increase the capacity of the major works concerned. This is being implemented by the installation of substantial carburetted water gas sets at all three places. This again is in conformity with the principle of 'least capital costs.' At Peterborough, which receives the cheapest Yorkshire coal in the area, it is estimated that the overall cost of carburetted water gas need be only 0.35d. per therm in excess of the cost of coal gas.

The Ipswich division, at vesting date, was faced in particular with an immediate shortage of gas at Braintree, while a new continuous vertical retort plant had just been completed at Colchester and another was in course of construction at Chelmsford. Braintree was at once connected, through Witham and Kelvedon, to Colchester, and a connection has since been made to Chelmsford. These connections form the basis of the grid shown in Fig. 3. Although, with the present arrangements of

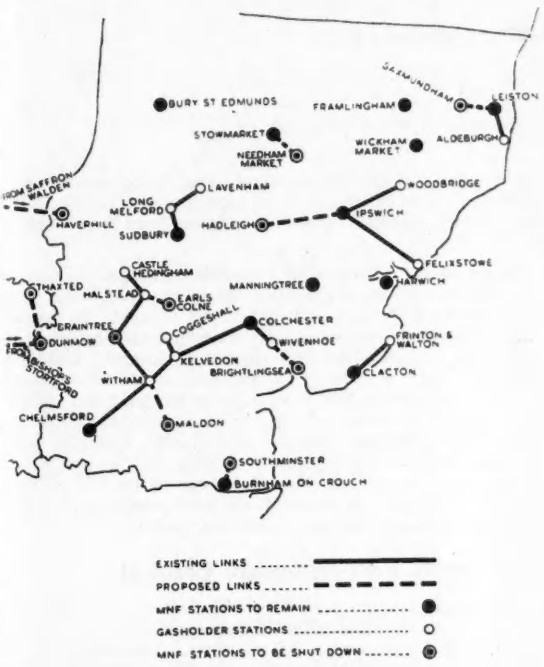


Fig. 3.—Existing and proposed linkages, Ipswich Division.

coal supply, the cost of coal gas at Chelmsford must be at least 1.56d. per therm dearer than at Colchester, the situation was such that it was not possible, at vesting date, to make any alteration in the already existing proposals for erecting a new plant at Chelmsford. The cost of cartage of coke back to Chelmsford would have cost about 0.66d. per therm in any case, thereby reducing any savings that might have been made by centralisation at Colchester.

The particular problem of the Norwich division is that the works at its largest manufacturing centre, at Norwich, is exceedingly cramped and is divided into two separate parts, about half a mile distant from each other. Further extension on either site is impossible. The proposal has been made for the construction of an entirely new centralised station on the waterside at Lake Lothing at Lowestoft. The proposals include a supply to Great Yarmouth, Gorleston, and a number of smaller undertakings, and are shown in detail in Fig. 4.

This, the supply of a county town in bulk, from a neighbouring seaport, 26 miles distant, is an interesting case.

Supply to Norwich

The case of the supply to Norwich, and the proposal to set up a centralised manufacturing station at Lowestoft, has been chosen as one that illustrates a problem that must arise in a great many places throughout the country.

The present maximum daily demand at Norwich is approximately 5 mill. cu. ft. calculated at a calorific value of 500 B.Th.U. per cu. ft. Any main laid from Lowestoft, a distance of 26 miles, should be large enough not only to supply those towns shown in Fig. 4 to be supplied from it, but also East Dereham and the group centred around Cromer. Extension to these places at some future date might well be justified. With these additions, and an allowance of 50% for future increases, the maximum load on the proposed main from Lowestoft to Norwich would be approximately 10 mill. cu. ft. per diem. Even if supply to Yarmouth and Gorleston is excluded in the initial stages, the first unit of plant would be big enough to produce gas within the cost basis in mind.

The overall cost of gas transmission from Lowestoft to Norwich is estimated at 0.51d. per therm at full development.

The comparative costs, allowing for new plant in both cases, and based upon coal prices ruling at January 1, 1952, and a net receipt of 85s. per ton for screened coke, are given in columns 1 and 2 of the following table. Costs for gas at Norwich, manufactured at Lowestoft and adjusted for the cost of transmission and a haul on all coke at a cost of 8s. 8d. per ton (2s. 6d. less than the rail charge from Lowestoft to Norwich) are given in column 3. The cost of coke for manufacture of 100% carburetted water gas is taken at the cost of bringing London coke by sea to Lowestoft, and to Norwich by sea *via* Yarmouth. This is estimated at 92s. at Lowestoft and 99s. at Norwich.

	Cost in Pence per Therm		
	Col. 1	Col. 2	Col. 3
Manufactured at	Norwich	Lowestoft	Lowestoft
Cost at	Norwich	Lowestoft	Norwich
(1) 90% I.V.C. from Yorks nuts + 10% C.W.G.	10·99	9·40	10·46
(2) 66% I.V.C. from Yorks nuts + 34% C.W.G.	10·88	9·71	10·52
(3) 90% I.V.C. from unscreened Durhams + 10% C.W.G.	10·01	8·26	9·38
(4) 100% C.W.G.	10·72	10·50	11·01

These estimates show that there is very little difference between any of the alternative schemes considered, except in the case of the carbonisation of Durham coals at Lowestoft.

It is also shown that at Norwich, as at Tottenham, there is no advantage in carbonising Yorkshire coals over the manufacture of water gas. The last extension now being carried out at Norwich is, in fact, a carburetted water gas plant of 2.5 mill. cu. ft. per diem capacity.

It should be pointed out that part of the advantage to be gained by erecting a new works at Lowestoft is due to the larger boats that can be accommodated at that port.

The above investigation of the Lowestoft proposal has been made only in relation to the gas required for Norwich itself. No account has been taken of the fact that the existing works at Lowestoft is obsolete, and of the savings that would accrue from the closing not only of this works, but also of the other smaller works involved in the scheme of integration. The figures show that the proposed centralisation of manufacture at Lowestoft, even if only Yorkshire coals can be obtained, will enable a reduction in the cost to the nearer, but smaller, undertakings even though at least 50% of the gas made will have to be pumped to a major centre 26 miles distant.

Oil Gas

Consideration of the case of Norwich calls for some reference to other processes of gas manufacture, based upon heavy oil.

Two processes are available: a direct process making gas

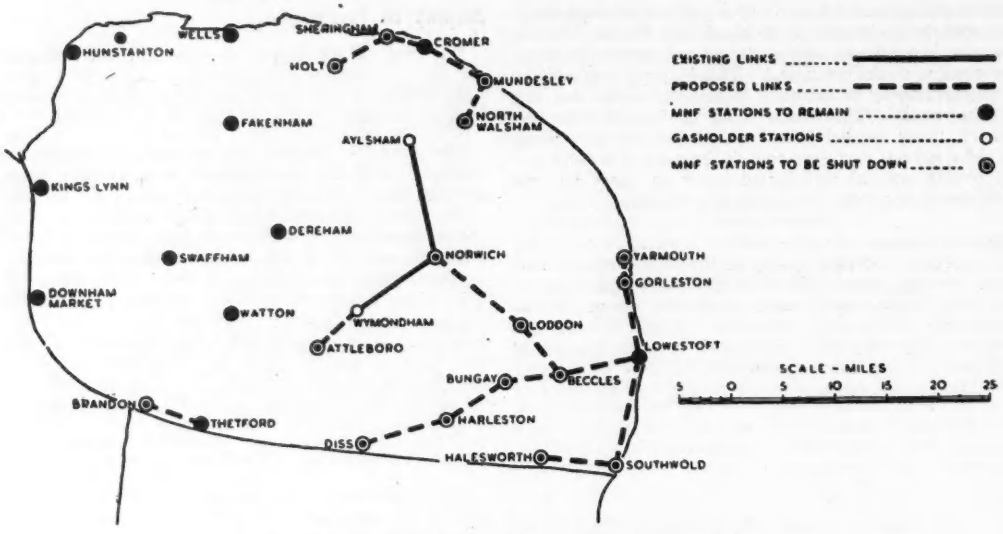


Fig. 4.—Existing and proposed linkages, Norwich Division.

at a calorific value of approximately 1,000 B.Th.U., at a specific gravity of 0.86 (Semet Solvay), and a catalytic process producing gas at a calorific value of 450 to 500 B.Th.U., at a specific gravity of 0.50 to 0.55 (Segas).

Both these processes have been described elsewhere, but there is not yet available sufficient information or experience upon which to base firm estimates of production or capital costs. The following tentative estimates are given, however, for comparison with the figures for coal gas and carburetted water gas quoted in the previous chapter.

Semet Solvay	Cost per Therm (pence)
1·043 gal. heavy fuel oil at 9·5d. per gal. ...	9·91
Process cost	1·00
Capital cost 0·50d. at 66·7% load factor ...	0·75
Total	11·66

Segas	Cost per Therm (pence)
0·80 gal. heavy oil at 9·5d. per gal.	7·60
Steam from oil-fired boiler	1·33
Process cost	1·00
Capital cost 0·50d. at 66·7% load factor ...	0·75
Total	10·68

These estimates, though approximate, show that neither process should be debarred from consideration in cases such as Norwich.

The Semet Solvay gas presents some problems in utilisation. Dilution with producer gas to a more usual calorific value would still leave a high specific gravity, and the capacity of existing mains systems would be reduced. The only possible method of use would appear to be to distribute it without dilution and, therefore, in isolation. It should be noted that in such a case the carrying capacity of any mains system would be 53% greater than with a normal gas of 500 B.Th.U. and 0.5 specific gravity.

The distribution of Segas, either alone, or mixed with other gases, presents no special difficulties. In fact, it offers unique possibilities in its strategic application.

Hitherto, gases derived from heavy oil have been mainly spoken of as auxiliaries to coal gas and water gas enabling peak-load gas to be made in plant of comparatively low capital cost. The estimates of cost already quoted show that these gases could, in areas of high coal cost, be used for distribution on a 100% basis.

It is possible to envisage a number of towns, 10 to 30 miles apart, such as exist in the Eastern Counties, each provided with a single oil-gas plant, and interconnected by a system of mains capable both of supplying intervening villages and passing marginal quantities of gas from one town to another.

These oil-gas plants would operate entirely on heavy oil and electric power, any process steam required being raised from oil-fired boilers. Capital costs would be greatly reduced as there would be no sidings, no weighbridges, little roadways, few operating employees and, therefore, small provision for their welfare. Provided that it can be established that there will be no difficulties with tar blockage and effluents, one man, or at most two, per shift at each station should suffice for operation. Repairs and purifier changing could be carried out on a group basis. During the off-peak periods of the year, the plants could be closed down for repair in sequence while the gas requirements were pumped as marginal quantities through the interconnecting mains.

Bulk Supply from Derbyshire Coalfield

The north western corner of the Eastern area at Peterborough lies only about 80 miles from the Derbyshire coalfield, and to test the economics of affording a bulk supply of gas from a carbonising plant situated upon this coalfield the scheme outlined in Fig. 5 has been drafted. The scheme as shown covers the additional requirements of the Watford division at its southern limit and those at Norwich at its eastern extremity. All the intervening stations are covered, with an overall allowance of 50% for future increases.

It is estimated that such a scheme would cost £4.04 mill. in mains alone. At full throughput, reaching a maximum day of 41 mill. cu. ft., the total cost of transmission, including all compression and capital charges, is estimated at 1.50d. per therm. At present demand, representing two-thirds of this quantity, the cost would be 1.90d. per therm.

Two estimates of the cost of manufacture on the coalfield are summarised below. One is based upon a coke oven plant selling hard coke, and the other on an intermittent vertical chamber plant producing coke at a price that would permit transportation to the Eastern area and sale within the scheduled prices. Both estimates include all capital charges and allow for a load factor of 66⅔%.

	I	II
Plant	Coke Oven	I.V.C.
Coal	Washed Slacks	Nuts
Coal price (per ton)	55s. 6d.	60s. 6d.
Coke price (per ton)	81s. 8d.	57s. 6d.
Gas cost (per therm at works) ...	3·84d.	8·67d.
Gas cost plus transmission	5·34d.	10·17d.

The second alternative shows no substantial advantage in overall cost over those given in Fig. 1 for Tottenham, or for Norwich, far less for such centres as Peterborough, where more advantageous coal prices apply. In no circumstances could the expenditure of £4.04 mill. on mains be justified for such a doubtful margin of saving.

The realisation of the first alternative is dependent, in the first place, on there being an adequate and reliable demand for hard coke, or, alternatively, the availability of surplus gas from existing ovens. The scheme also implies the abandonment of coke supply by the Eastern Gas Board over a large part of its area. The view could be taken that this might not necessarily be contrary to a sound national fuel policy. If the National Coal Board intends to develop further plants for the production of briquetted fuel by carbonisation of washery slurries, on the lines of that at Aberaman in South Wales, it may be proper to allow this fuel to replace gas coke in order that coking coals may be diverted to the production of hard coke.

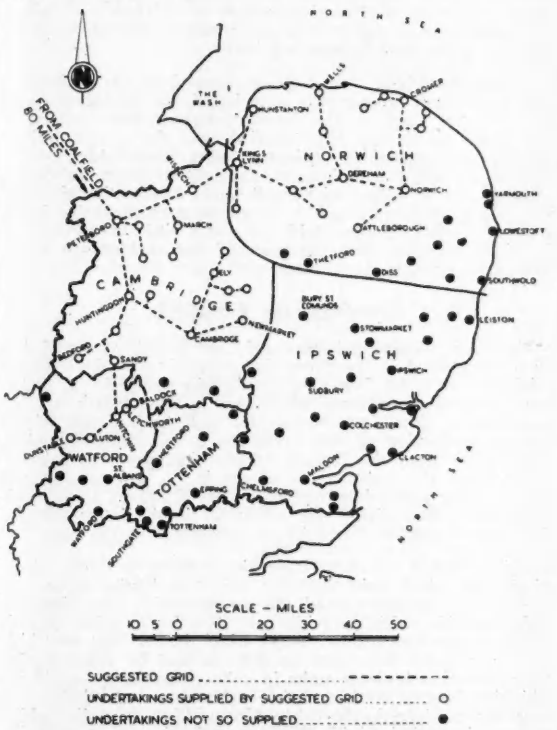


Fig. 5.—Map showing an Outline Proposal for the Supply of Coal from the Derbyshire Coalfield to the Eastern Gas Board Area.

The chief handicap to any scheme of this nature is the heavy initial cost of mains, which, to be fully utilised, must be backed by further expenditure on new carbonising plant at the central source, and the writing off of the capital value of local plants. It could not, therefore, be lightly entered upon at the present time. The initiation of a scheme such as this, within a period of about five years from 1952, would, however, be assisted by the known shortages in the Watford division, which will involve the construction of plant of a production capacity of some 20 mill. cu. ft. per diem within about 10 years. If, initially, only those mains that were required for the supply of the Watford division were laid, the total transmission cost at a maximum daily load of 20 mill. cu.ft. would only be 2.25d. per therm.

Alternatively, if the scheme were designed solely for the supply of Hitchin and Luton, without any margin of capacity for extension to other centres, the total cost of transmission at the same load would be 1.56d. per therm.

Butane-Air and C.W.G.

Two butane-air plants are now being constructed for the Eastern Gas Board. They will be installed at Bungay (10 mill. cu. ft. per annum) and Framlingham (4 mill. cu. ft. per annum).

The standard plants now being constructed have a capacity of approximately 1,000 therms per diem and are therefore applicable to undertakings with output up to 45 mill. cu. ft. per annum (calculated on the basis of 500 B.Th.U.). At full output, the capital charges, labour (one resident attendant) and maintenance should not exceed 1.25d. per therm. The only remaining cost is that of butane.

The sources of butane are not very well placed in relation to the Eastern area, and long road hauls will be necessitated. It is not anticipated that the delivered price will be less than £30 per ton, or 15.8d. per therm. The overall cost at full development cannot therefore be less than 17.05d. per therm.

In comparison, a small carburetted water gas plant, rated at 200,000 cu. ft. output per diem, will have the same capacity. Allowing for duplication of plant to cover repairs, it is estimated that the overall cost of manufacture cannot be less than 15d. per therm when supplied with coke at a delivered price of 90s. per ton. Further analysis of cost shows that butane-air will be the cheaper below an output of 22 mill. cu. ft. per annum, and carburetted water gas cheaper above this output.

The advantage of butane-air for small undertakings lies in its low capital cost and the low cost at which a plant could be moved from one site to another. It can therefore readily perform the duty of covering supplies from small undertakings until such time as schemes of inter-linkage can be undertaken.

A larger carburetted water gas plant, rated at 500,000 cu. ft. per diem would be adequate for an undertaking having an annual output up to 112 mill. cu. ft. per annum. In such a case, the cost per therm could be brought down to 12.7d.

DISCUSSION

Mr. T. C. Battersby (Eastern Gas Board) said that the problem of supplying a wide and mainly rural area such as the Eastern must revolve around the price of raw materials and the economic distance for transporting gas and residuals, and the efficiency with which the smaller works could be operated. The price of raw materials was of paramount importance, and was dependent on policies which they could only in a small way influence. They must, therefore, base their own policy on fundamentals as far as possible. The use of seaborne coal was very desirable, and he applauded the scheme of the Norwich division to use a deep water port as the centre of manufacture; but inland, where railway rates alone affected the price of coal, he maintained that the place to manufacture gas was as near to the centre of consumption as was consistent with an economic size of works. This would apply so long as coke was required in such quantities as it was at present. If coke was replaced partly or completely by another fuel, and the gas industry was not subsidising coke transport, then long distance transmission of gas might become economic.

They should not let railway rates as they existed at present unduly influence their choice of gas manufacturing sites. The railway freight rates were overdue for review and the anomalies were likely to be removed. He would call their attention to the prices of Yorkshire nuts at Luton and St. Albans, a distance apart of 12 miles, of 89s. 8d. and 91s. 9d., respectively.

In order to compare the results of the Berkhamsted works with those of Ponders End, he took the same basic prices for coal and residuals and obtained the following results:

Net coal at	Ponders End	6.15d. per therm
	at Berkhamsted	6.16d. per therm
Total gas cost at	Ponders End	8.39d. per therm
	at Berkhamsted	9.74d. per therm

a difference of only 1.35d. (1.0d. being in process wages—the weak point obviously due to size of works—and the whole of the remainder in repairs and maintenance, an advantage which must go to a new works). The load factor of Ponders End was 87.5%, and of Berkhamsted 62.0%.

Here, he would suggest, the genuine comparison ended, but as the actual capital charges at Ponders End amounted to 1.42d. per therm, while at Berkhamsted they were 0.2d.

To complete the consideration of the Eastern area gas supply, it was necessary to consider a bulk supply from the Derbyshire coalfield; and although this scheme appeared economic, he agreed with Mr. Rose that the expenditure could hardly be justified at the present time, although the situation might differ as research into total gasification made headway. He wondered whether, by gasifying all his coke in a water gas plant, Mr. Rose could produce a scheme more economic, but he found that if all the coke from the coke ovens was used in a water gas plant, the cost per therm would be in the region of 8d., or in the other case, with an intermittent vertical chamber plant, the cost per therm would be 9d., and on top of this there were the distribution charges to be added, and also the capital charges on existing plant. This, however, did again bring up the question of the possible abandonment of coke supply.

Coal/Coke Price Ratio

Mr. T. C. Finlayson (Woodall-Duckham Company) said it should be emphasised that the author's calculations, as regards cost of gas production, could not be indiscriminately applied to other parts of the country in view of the unusual conditions obtaining in the Eastern Gas Board area—namely, the low value of coke as compared with the cost of coal. He believed that it would be found that the relationship of cost of coal to value of coke in that Board's area did not conform to the average conditions throughout the gas industry.

One's first reaction after reading the paper was the relatively cheap therm produced by intermittent vertical chambers when carbonising Durham run-of-mine coals. He felt that the author could usefully have supplied an extra curve in Fig. 1 showing the cost per therm in continuous vertical retorts when carbonising the same Durham run-of-mine coals. Had this been done, it might well have been found that, under certain comparable conditions, the cost per therm in continuous vertical retorts would be little different from intermittent vertical chambers.

He wished to emphasise two main points which they should remember every time they thought about this subject. Firstly, that the influence of the price of coal was greater than the influence of type of plant in comparative costs of manufacture. In other words, however efficient the carbonising plant, one could not make cheap gas from high-priced coal. Secondly, the coal/coke price ratio was the most important single factor in the economics of gas production. One could not expect cheap gas if coke was being sold below the price of the coal being carbonised. Those were the two main factors which led to some of the rather unusual conditions ruling in the Eastern Gas Board area.

Finally, a true economic comparison between various systems of carbonisation must be based on identical coals working under similar conditions of calorific value, producer gas dilution, and benzole extraction.

A careful study of the paper showed that all the intermittent vertical chamber figures were based on the production of 560 B.Th.U. gas, substantial producer gas dilution, and the extraction of 3 gal. of benzole per ton of coal, whereas for continuous vertical retorts there was practically no benzole extraction or producer gas dilution.

Mr. H. S. Cheetham (Humphreys & Glasgow, Ltd.) commented that the costs of coal gas were given in the paper on 100% load factor basis. The same applied to water gas. He would like to see a chart drawn up on the basis of the average cost of base load and peak load water gas; and he thought that at present, under that condition, the cost of water gas might be transferred to a somewhat lower position in Fig. 1.

Mr. Rose mentioned that the quantity of oil used by the gas industry in the year 1950-51 was 4.5 times as great as that used in 1938. During the same period, the coal used by the industry increased by 44%. He (the speaker) had taken out some figures on costs during those periods, and he thought they were probably applicable to the Tottenham basis. The figures showed that the price of coal during the period increased by 150%, whereas the price of hydro-carbon oil—*i.e.*, gas oil in this case—increased by 117%. This price differential in favour of gas oil was not, of course, sufficient to be the only factor in regard to the extended use of water gas. He thought that the question of the coke price was probably as big a factor or even a bigger factor.

The author had suggested that the use of hydrocarbon oil might be extended in gas manufacture. He thought that in the present circumstances that might well be so, particularly having regard to the necessity to minimise capital expenditure and the use of steel. Catalytic oil gasification plant was now in routine operation. So far, it had been constructed only in small sizes, but the time was not far distant when they would see that plant available in larger units. Having regard to the present difficulties in regard to the supply of domestic coke and the necessity of keeping coke appliances fed, he thought that there might well be a development in that direction, with catalytic oil gasification plant using hydrocarbon oil which might contain up to as much as 8% of carbon.

The author mentioned the possibility of a number of works, each provided with oil gas plant, inter-linked. Again, he thought that might well be a possibility. But in regard to steam production the author said that they might provide each of these works with an oil-fired boiler. He would mention that in one particular type of catalytic oil gasification plant, the waste heat boiler produced the whole of the process steam which was required.

Butane blue gas was now in operation. It produced a gas which was satisfactorily substituted for the normal type of town gas used on the smaller works. This question of the small works had been studied, and there were quite a number of responsible engineers today who held the view that it was still economic to produce gas in horizontal retorts in small works. That might well be so, but he thought there was a great deal to be said for butane blue gas, and that in the case of works of, say, 10-15 mill. or a little more capacity, it might be found that the price of butane blue gas was a little lower than that of butane-air.

Gas from the Coalfields

Mr. H. D. Greenwood (National Coal Board) remarked that it was suggested in the paper that a supply of coke oven gas might be brought from the Derbyshire coalfield to Peterborough and from there distributed to the centres of consumption in the Eastern area. He gave an estimate of the cost of production of coke oven gas in this coalfield and of transmitting it to the Eastern area, which was very substantially below the present cost of gas in the area or the cost of producing gas in intermittent vertical chambers at the coalfield, the author giving due allowance in the latter case for the cost of sending the coke to consumers in the area.

This proposal was very interesting. There was one school of thought which said that they might carbonise more coal at the coalfields and transmit the gas over fairly long distances, and that this might provide gas at a lower price than it could be made at a small works which had to pay very high prices for coal. There was much to be said for concentrating gas production in large units in coke ovens in the coalfields with the cheapest coals and the best reserves of suitable coal—as, for example, in the Derbyshire coalfield—a policy which was not inconsistent with the new coal price structure which came into force at the beginning of this year. Some time ago he made some calculations on rather similar lines to those of Mr. Rose, and having now seen the author's figures for the present cost of production in the Eastern area, his own rough calculations, although giving somewhat higher figures, also showed that there was a considerable economy in transporting coke oven gas from the coalfield.

The most difficult aspect of this problem, however, was the maintenance of the local coke supply, and the author's comparison was based on the assumption that the present supply might be replaced by some other carbonised fuel—for example, carbonised briquettes. If coke oven gas in large quantities was to be made in Derbyshire, they should base their calculations on the coke which would then be produced being sold not for metallurgical purposes, but for general and domestic consumption. In this case, were they justified in taking the present coke oven gas prices as a basis, as was done in the paper, since that coke might have to be sold in the Eastern area?

They must assume, in making comparisons between long distance and local gas supply, that if the consumer got cheaper gas from the pithead, he must expect to pay something more for his coke.

The author credited coke at 81s. 8d. at the coke ovens, compared with a figure which he mentioned of 84s. 9d. at certain places in the area. In a free market, the coke price in the area would presumably be related to the price of coal, and it would be necessary to study very carefully the probable revenue of coke.

The whole difference between the coke oven and the intermittent vertical chamber seemed to lie in the relation between the coal and the coke prices, and this relation would be a major factor in determining whether or not pithead carbonisation would be more economic than local carbonisation.

Calorific Value

Mr. T. Nicklin (North Western Gas Board) noted that the author had not considered supplying gas at a lower calorific value than 470 B.Th.U. This was strange, since, when the net return for coke was less than the purchase price of coal, the economic calorific value tended to reduce, and was in general the lowest calorific value that could be accommodated having due regard to limits of gas distribution. A calorific value of 450 should have been considered since the additional cost of gas distribution might well be more than outweighed by the benefits of the lower cost of gas manufacture. The low return for coke in the Eastern area obviously indicated the need to utilise the coke they produced to the most economic advantage, which was clearly to make as much gas as possible from coke.

The quantity of coke that could be gasified was naturally dependent on the resultant coal gas, water gas, and/or producer gas mixture, and the calorific value of the distributed mixed gas. The use of oil for carburetting at the price shown—namely, 13.625d. per gal. was obviously to be restricted to a minimum and was another reason for examining a lower declared calorific value than the 470 mentioned by Mr. Rose.

In the paper the cost of manufacture of carburetted water gas was shown to be constant or falling in the calorific value range of 470 to 500. This would appear to be an error, since an increase in use of oil at 13.625d. per gal. would increase the cost of C.W.G. manufacture as the calorific value was increased. He had re-calculated the cost of C.W.G. manufacture using the raw material costs given in the paper, and found that C.W.G. at 450 was 0.3d. per therm less than the cost of C.W.G. at 500

Consideration had been given to a bulk supply to the Eastern area of the Eastern Gas Board from coke ovens situated in the Derbyshire coalfield. Two estimates of the cost of manufacture on the coalfield are given, based on coke ovens, and intermittent vertical chambers. Referring to the coke oven costs, he noted that the coal price per ton for washed slacks was given as 55s. 6d. However, since the coke ovens would be producing hard coke, this would involve blending with either South Wales or Durham coal, and the figure of 55s. 6d. would appear to be on the low side.

Considering the economical size of coke oven battery, the capital cost per therm when making 500 gas at a load factor of 66⅔% amounted approximately to 3d. per therm, and he was at a loss to understand Mr. Rose's figure of 3.84d. for the total cost per therm including capital charges, this figure only leaving 0.84d. per therm for materials and labour. The cost per therm including capital had been calculated to be approximately 5¼d. at a calorific value of 500, 5½d. at 475, and 5¾d. at 450, the figures being based upon producer gas dilution in the case of 500 and 475, and blue water gas dilution in the case of 450 gas. The gas cost plus transmission would, therefore, be approximately 7d. per therm, and whereas it did show an advantage against locally produced gas, he felt that the relative price of coal and coke needed more clarification.

From a consideration of the load factor—namely, 66.7%—and the relative costs of coal and the realisable price for coke it would appear that thought should be given to the economical combination of coal gas and carburetted water gas at an economical declared calorific value, this being suggested, in view of the conditions applying, at 450 B.Th.U.

The author had considered the variation in cost of manufacture throughout the area solely from the aspect of coal price and had not varied the coke price in step with coal. In practice, regions of high coal price might be expected to command a higher coke price. The important criterion was, of course, the price of coal less value of residuals.

Mr. D. N. McCaskill (Eastern Gas Board) spoke as a District Engineer in one of the more modern small gas plants in East Anglia. Emphasis, he said, had been placed primarily on the reduction in price to be obtained by carbonising in large plants where regular access could be gained by seaborne coal. However, the paper was directed by a national policy, and he enquired whether coal transport cost comparisons included for capital cost and depreciation on Gas Board owned coasters. The railways in East Anglia were seriously in need of work, and a slightly increased charge on the gas industry might be of benefit nationally if rail transport was adopted. Mr. Rose had stated that, in a scattered area of supply, costly gas mains had to be run, and there was the additional cost of area coke delivery; and he gave a 'back distribution' charge of 6s. per ton for the London area, so that an even greater figure must be considered in East Anglia if a bulk supply was to be given. Presumably similar remarks applied to refined tar distribution. On the other hand, Mr. Rose had said that no very substantial case could be made against manpower efficiency, and the thermal yield in the more efficient of the small works was quite good, and in some cases was comparable with the large plants. Bearing this in mind and the advantage of the smaller units in wartime, he suggested that those smaller, efficient plants, which all appeared to be centrally situated, should be allowed to continue in gas manufacture, and to be suitably enlarged to act as area sub-stations of supply. With works as at East Dereham, an excellent coke was produced which was meeting a rural demand, where no difficulty was experienced in its distribution.

Considerable time and research and new capital were being put into the manufacture and bulk distribution of the 'cheap' therm. To the district official, however, it would seem that further investigation should be concentrated on reduction in consumer charges. For instance, the capital cost for a new domestic gas meter and for its fitting frequently wiped out the profit for many years. Could not some revolutionary simplification of meter design reduce this heavy charge, which in many gas boards would help to eliminate their annual deficit?

EUROPEAN COAL SUPPLIES

AGREEMENT has been reached between the various Governments represented on the coal trade sub-committee of the United Nations Economic Commission for Europe for the distribution of 9.7 mill. tons of European coal and 3 mill. tons of coke for the third quarter of 1952.

A deficit in European coal and coke supplies of approximately 7 mill. tons for the quarter had been revealed in May at the first of a series of three meetings held in Geneva to consider the quarter's supply and requirements position. This position was improved by the offer of a further 615,500 tons of coal from the United Kingdom, 550,000 tons from Poland, 90,000 tons from Western Germany, 181,000 tons from France and the Saar, and 132,000 tons from Belgium, of which 50,000 tons was not, in fact, taken up.

The main difficulty in arranging the September quarter distribution of European coal arose from the firm demand of countries for larger quantities of German coal than could be made available from Western Germany. While this problem has only partly been eased by the additional offers of coal, these supplies will help to reduce the quantity of coal that still has to be obtained from the United States to make up the remainder of the deficit in European supplies.

Agreement was unanimous, but was only made possible by a number of importing countries accepting smaller quantities of German coal than they would have liked—*e.g.*, Austria, the Netherlands, Greece, and Luxemburg. The Netherlands reserved the right to continue bilateral discussions with the authorities in the Western Zones of Germany.

The total figure of 12.7 mill. tons of European coal and coke exports to meet 17 countries' import requirements for the quarter, exclusive of 1 mill. tons to move from France and the Saar to Western Germany and 1 mill. tons from Western Germany to France and the Saar as an exchange, represents an increase of 2 mill. tons over the export programme of the second quarter.

Abstract of Comm. No. 408

Water-in-Tar Emulsions

by

S. C. PORTER, A.R.I.C., A.M.I.Chem.E.,

Chief Chemist, Ipswich District, Eastern Gas Board

IT is proposed to outline a problem that has engaged attention for some years at Ipswich. The sealing tar used in a 2 mill. cu.ft. M.A.N. waterless gasholder rapidly became emulsified with water condensed from the gas. The resulting water-in-tar emulsion was of extreme stability, and gave rise to much operational trouble. In winter, a water content of up to 65% by volume was produced, which dropped in summer to 10% to 15%, depending upon atmospheric temperature. Frequent adjustments of tar volumes in circulation thus became necessary.

Specific gravity at 15°/15°C.	1.120
Water	0.6% v/v
Oils to 160°C.	2.9
„ 200°C.	5.9
„ 240°C.	10.3
„ 270°C.	13.5
„ 300°C.	21.3
„ 330°C.	37.7
Phenols (in oils to 330°C.)	0.7% v/v
Viscosity at 50°C.	7.5 Engler.
Insoluble in toluene	2.2% w/w
Ash	0.1
'Free carbon'	2.1

For comparison, an abstract of the original M.A.N. patent specification for sealing tar may be quoted:—

> 'The use of a coal tar fraction, b.p. 210° to 450°C. (or closer) is claimed; it should be free from pitch, dust, naphthalene, anthracene, and phenols, have density c. 1.10, viscosity 1.8 to 3.5 Engler at 50°C., and give no precipitate at about 30°C. A preferred method of manufacture is to take the above fraction, super-cool it for several days, and re-distil the filtrate therefrom, using the new 250° to 450°C. fraction for the seal.'

It may be noted that, in practice, some variation in viscosity must be permitted, because of benzole recovery. The significance of the presence of toluene-insoluble matter will be discussed later.

The Ipswich view of the mechanism of emulsion formation is that it takes place at the rubbing-bar. Here, the tar film on the holder plates is overlaid by a film of condensed water from the gas. When the piston falls, the two films are subjected to considerable shear, and emulsification occurs. In flowing down to the tar dam, the emulsion is subjected to modification in water content, depending on gas and atmospheric temperatures. From the dam, the emulsion passes to the bottom collecting tanks, whence, if no separation of water takes place, the unchanged emulsion is returned to the seal.

Viscosity-Water Relationship

A study of the viscosity-water relationship was made on a series of emulsions prepared from a 5% emulsion by the addition of further water. It was found that, for the range of initial tar viscosities normally encountered in practice, an increase in viscosity, practically linear, occurred up to about 45% water content. Within this range, the Hatschek equation[1] closely applied. Above this value, the flow became non-Newtonian, and accurate measurements of viscosity were impossible on the Engler instrument. Fortunately, the wide variations in viscosity that might have been expected to cause great variations in pump runs on the holder were in fact found to be automatically compensated. Partial benzole recovery being normal practice, there remained some benzole (about 1.5 gal. per ton of coal) in the gas. This was sufficiently absorbed in winter to keep the viscosity within satisfactory limits; in summer, the sealing medium lost benzole, thus compensating for the lower viscosity consequent on lowered water content.

Tests with samples of emulsion, as already indicated, showed that additional water could readily be incorporated by simple stirring in, so that it was essential to remove any free water that might occasionally appear in the collecting tanks, or in the dam, in order to minimise emulsification. These tests showed, also, that at about 75% of water content the emulsion became unstable and partially broke; but experiment further showed that up to about 90% of water content could be held for a period. It is of interest that 74.04% is the theoretical maximum water content if the particles are assumed to be spherical; that this value could be exceeded indicates that some distortion must have occurred.

At no time was c. 75% ever exceeded on the holder itself, and this content was found only in the surface layers of the seal, dam, and collecting tanks. When this occurred, a supernatant layer of free water was always present.

Laboratory Experiments

Extensive laboratory work was carried out in an attempt to break the emulsion. Heating to c. 190° to 200°F., even for days, was completely ineffective, and while freezing led to some breakage, subsequently thawing was rapidly followed by re-incorporation of water, unless an immediate separation of the two phases was made. High-speed centrifuging at ambient and elevated temperatures was equally useless; electrolysing was partially successful, but offered no prospect of a practical solution. Many electrolytes were tried without success, while *p*H control of the disperse phase had no effect. The observation that instability could occur at about 75% of water content led to experiments based on the principle of breakage by addition of excess of the disperse phase. Addition of excess water, followed by agitation, produced some breakage, but the results were not reproducible, thus confirming plant observations.

Addition of a finely divided solid, preferentially wetted by water, was tried. Flue dust caused some reduction in water content. Powdered slate, successfully applied to water gas tar emulsions also led to a reduction. It was observed that in each case, and irrespective of initial water content, an upper layer of emulsion containing c. 75% of water was produced, with partially dehydrated tar below. This will be considered again later. Percolation through a bed of coke gave an immediate and almost complete separation, but the coke quickly became clogged with tar, and filtration ceased.

It was shown that in the absence of the toluene-insoluble fraction (the 'free carbon') the remainder of the tar did not form a stable emulsion with water. Re-incorporation of the wet carbon restored the propensity to emulsify, but the dried (at 102°C.) and powdered 'free carbon' was ineffective. It is concluded that the micellular structure of the 'free carbon' is not completely broken down until it is heated, when, at least under the conditions of shear obtaining in the homogeniser (a B.E.L. domestic cream-making machine), it is unable to lower the inter-facial tension to the value required to produce a stable emulsion.

Large Scale Tests

A review of the literature disclosed that the problem of emulsification in waterless holders is not a new one. A patent[2] claimed the use of soap and/or waterglass as a demulsifier (ineffective with the Ipswich emulsions). Ward[3] removed condensed water and benzole by steam-heating and circulating heated gas from the holder through the tar.

There was afforded at Ipswich, in the early part of 1949, an opportunity of inspecting in various parts of the country a number of waterless gasholders working under a wide range of conditions, and used for storing vertical, horizontal, and water gas (and mixtures of the three), and coke oven and blast furnace gas. Evidence of the formation of emulsion was to some extent found in all cases, but successful de-watering was general. No evidence was found that the composition of the gas was significant.

In three cases, demulsification was shown to be due to the presence of finely divided siliceous dusts, adventitiously introduced from a blast furnace, a Bessemer plant, and a factory boiler stack. It was also apparent that the design of the bottom collecting tanks was of primary importance, the principle that the incoming tar should enter at a controlled point below the surface of the tar in the tanks being an essential feature.

New tanks, based on a design embodying these requirements, were built and installed at Ipswich. Some improvement in the reduction of water was obtained, but results were adversely affected by unavoidable condensation of water in the holder in excess of that normally encountered in practice. At this stage, in the light of results to date, it seemed certain that a full solution to the problem lay in neutralising the emulsifying action of the 'free carbon,' since this appeared to be the only over-riding factor, and would remove the cause of the trouble.

Attention was drawn, in 1949, to the use of surface-active agents in breaking water-gas tar emulsions[4, 5]. The possibility of applying such substances to coal tar emulsions presented itself. A number of agents were tested 'Santomerse' No. 1 (anionic), 'Teepol' (also anionic) and 'Amine' 220 (cationic). A concentration of 0.02% of the last named was found to be completely effective, the anionic agents having no effect. Tests were also made with a methyl-silicone fluid, 'D.C. Antifoam' 200, with similar success. Emulsion breakage was independent of the initial water content, but the application of heat was necessary in the higher range of viscosities caused by a low light oil or benzole content.

A large-scale test was then carried out on a batch of about 1,000 gal. of emulsion removed from the holder. An initial water content of 55% was reduced to 2.5%. No evidence of any undue tendency to inversion was found, provided that the minimum effective concentration of the 'Amine' was not exceeded.

It was decided, in view of the success of these trials, that the process should be applied to the tar in circulation in the holder. The calculated quantity of agent, in solution in washed creosote oil, was added at intervals over a period of six months. Gradually increasing quantities of water separated in the collecting tanks, and were automatically run off. Regular tests of the tar at the pump deliveries were made in order to follow the progress of demulsification. At the onset of cooler weather, in the autumn of 1951, all tar in the holder, with the exception of a shallow surface layer on the dam, had a water content of between 4% and 5%. This value has been maintained throughout the winter.

'Amine' 220 is almost insoluble in water, and so remains in the tar. To date, no further additions of the agent have been made, but it may be necessary to add small amounts as 'make-up' in the course of time. Until the wet supernatant layer in the dam goes into circulation in the coming summer, it will not be possible to state whether the agent is preventing the formation of emulsion or whether it is merely reducing stability. Laboratory tests have shown, however, that the 4%-5% emulsion cannot be extended by stirring-in additional water.

Mechanism of Emulsification

Finally, as a brief note on the mechanism of demulsification, it can be said that it is generally recognised that the behaviour of different emulsion systems is highly specific[6, 7]; each must be regarded as an individual problem. It is suggested that the example discussed in this paper provides confirmation, and the further suggestion is offered that one or both of the following mechanisms may apply:—

(*a*) Displacement of the 'free carbon' from the interface, the cation-active agent causing the emulsifier to become more wettable by water, thus reducing stability and leading to breakage.

(*b*) Antagonistic effect of the agent, tending to promote an emulsion of the opposite type, namely, tar-in-water; during inversion, the stability passes through a minimum at the phase-inversion point.

The Ipswich work so far indicates that the former is probably the operative mechanism.

1 Hatschek. "Viscosity of Liquids," p. 202.
2 B.P. 408, 742.
3 Ward, *Gas Journal*, 1938, **221**, 963 to 966.
4 *Gas World*, August 27, 1,408.
5 Moignard, L. G. Private communication, 1949.
6 Moilliet and Collie. 'Surface Activity'. (Spon, London, 1951.)
7 Schulman and Friend. *Mfg. Chem.*, **21**, 131.

DISCUSSION

Mr. S. Langford (Robert Dempster & Sons, Ltd.) said that the application of demulsifiers obviously had a wider field than that of waterless gasholder sealants; but his own immediate interest lay in that direction. The waterless gasholder at Ipswich was the first of the M.A.N. type to be installed in this country, back in 1927. Since that time the basic design and operating principles had remained unchanged, but certain features had undergone modification and improvement. For example, it was early recognised that efficient water separation was an important factor; and to that end the settling tanks at the base of the holder were re-designed. At a comparatively recent date the old tanks at Ipswich were replaced with those of more modern design; but, as the author mentioned, unavoidable excess condensation of water in the holder at the time unfortunately slowed-down the beneficial effect which was to be expected from the new tanks. It might, however, be pertinent to mention that on one M.A.N. holder he (the speaker) visited some years ago, storing blast furnace gas, two tons of water per day were being separated out automatically and efficiently, and there was no report of any emulsification trouble with the sealant.

Mr. Porter's contention that emulsification had its primary starting point at the rubbing bar was interesting, and certainly worthy of consideration, although he did not necessarily agree with the author 100%. An emulsion would be formed only if the conditions favourable to its formation were present. In other words, the rubbing bar was common to all M.A.N. holders; emulsification was not, though it was true there had been a number of other, if less stubborn, cases in this country.

He would be glad to have Mr. Porter's view as to the possibility that light fractions of the sealant were vapourised from the inner surface of the shell during the warmer daytime spell, and were condensed back on to the shell—together with the water vapour in the gas—through the night; condensing together in an emulsified form. This phenomenon was observed when distilling any of the oil fractions containing water. This did not necessarily oppose the rubbing-bar theory; indeed, the two might act in concert.

However that might be, it was quite clear from the author's record of successful efforts to break down the emulsion at Ipswich that, where prevention had failed and cure became a necessity, the application of a relatively quick-acting demulsifying agent under proper control might well be an answer to the problem. The question then arose—which demulsifier to use? Mr. Porter had shown them that C.A.220 had been exceptionally effective at Ipswich. Yet laboratory tests which his own firm's chemist had carried out with the same demulsifier upon samples from similar holders, with water content varying from 25% to 45%, had met with little success so far. Mr. Porter might agree that it was worth trying-out anionic agents, although at Ipswich these were ineffective and it was cationic Amine which did the trick. This underlined the suggestion that each problem must be considered separately.

It was noted that Mr. Porter considered it essential for the sealant to enter the bottom collecting tanks below the surface of the liquid in the tank. Had the author established at what particular depth the most satisfactory results were obtained?

To sum up, a great deal of research and experiment had been devoted to sealing media for waterless gasholders, and it was seldom nowadays that a really difficult problem arose. He again stressed the importance of adequate de-watering, which could do much to prevent, or at worst to minimise, emulsification trouble.

Each Holder a Separate Entity

Mr. W. H. White remarked that every holder had its own peculiar constructional characteristics, and with waterless holders this was most pronounced. Therefore each holder had to be considered as a separate entity. To determine whether a particular tar sealant was suitable or not, apart from its liability to emulsify, seal tightness tests should be carried out on a stationary piston at different temperatures. Leakage rates per foot run of seal at different viscosities could then be determined and, by taking into consideration the maximum rate and maximum distance of travel of the piston at peak period, at the same time correlating the pumping capacity and period of operation, together with benzolised or debenzolised gas, whichever was stored, one could then arrive at the optimum viscosity of sealant to maintain an adequate seal throughout the year. This being done, he felt sure that a more viscous tar would be suitable than the tar specified by Mr. Porter, with the result that emulsion troubles would be very much reduced.

The mechanism of emulsion formation expressed by Mr. Porter as taking place at the rubbing bar was interesting and to him surprising. He would have thought that the main cause of trouble was the intimate mixing of tar and water in the gear type pumps.

The treatment of the Ipswich tar with Amine 220 and its result provided most useful information, but he would add a note of caution. When attempting to solve emulsion problems of this nature by means of additives, consideration should be given not only to the sealant but to the effect on the canvas seal; they did not know the life of these canvas seals and great care should be taken to avoid de-naturing the canvas; otherwise they might add another awkward problem.

The author had mentioned that high speed centrifuging was useless. He would be pleased to have the details of the emulsion so treated and the results. Centrifuging had been successful on carburetted water gas tar emulsions, as far as separation was concerned, but the trouble was due to the slow and costly rate of treatment due to the task of removing the solid matter from the bowl after a comparatively short running time. He believed, however, that the Americans had perfected a type of centrifuge which could be operated continuously, the solids being automatically discharged while the centrifuge was running. This might be a solution to the problem of treating large quantities of emulsions locked up in various tanks.

Carburetted water gas tar—water emulsions, particularly in large quantities, presented an added problem because of the usual excess of fliers. Any advice, any data, would be welcome.

Mr. W. R. Dudden (North Thames Gas Board) said he was interested in the working of two waterless holders, one of 8 mill. cu.ft. at Southall and one of 1½ mill. cu.ft. at Staines. At Southall, no trouble was experienced with water emulsions in the sealing tar, the water content of this tar seldom rising above 1-2%. This was largely due to the fact that only gas of a low dew-point, received from other works of the North Thames Gas Board, was stored in the holder and that there was a daily inspection of the seal, when any scum could be removed. Trouble was experienced, however, owing to changes in viscosity due to benzole absorption by the sealing tar, and it had been necessary to adjust the viscosity, adding tar in the summer and withdrawing tar in the winter.

At the same time, the presence of benzole in the tar could give rise to bad conditions above the piston, especially when the atmospheric temperature rose suddenly after a cold spell. The lower the piston in the holder, the worse were the conditions, as there was a larger tar surface for the benzole to be distilled from. As benzole vapour was heavy, ventilation was difficult and it usually depended on the piston moving up and down. For these reasons, it had been decided to install a sealing tar conditioning plant. Such a plant would probably remove water difficulties, if they were experienced.

Considerably more trouble from emulsion was experienced at Staines, although the highest water content of the sealing tar recorded was about 35%. This holder stored a mixture of incoming dried gas from other works and undried gas from the works. Usually, however, this emulsion was floating in the boxes and seal, and the actual tar circulating down the holder sides had a much lower water content. It was hoped that they would look into this question and that surface reactive agents would be tried on this holder.

While he thought that the Ipswich view of the mechanism of the formation of the emulsion was probably correct, there was little doubt that often a mixture of tar and water, which, if allowed to settle without pumping for a day or so, would completely separate into a tar and a water layer, would emulsify if pumped before it had a chance to settle. That this was so was proved to some extent in two cases of water gas tar emulsification trouble, where, by allowing the water gas tar to settle in the separator and only pumping the low water content layer of tar from the bottom of the separator, very little emulsion had been experienced over quite a long period of years, and tar of less than 5% water had been consistently obtained.

A Significant Property

Mr. A. J. S. Wiseman (North Thames Gas Board) commented that the author had drawn attention to the maximum water content of emulsions—a property which was very significant. Sealing oil fell in the same class as carburetted water gas tar, oil gasification tar, gas oil, and some light tars from continuous vertical retorts inasmuch as all these fluids readily formed emulsions exceeding 74% in water content. Coke oven tar was distinguishable from these since it would not readily hold more than 55% of water as a true emulsion. A water content of 74%, as the author had said, was the theoretical maximum for uniform spheres in close packing, each touching 12 others, and might be exceeded if the spheres were not of uniform size or if deformation of shape occurred.

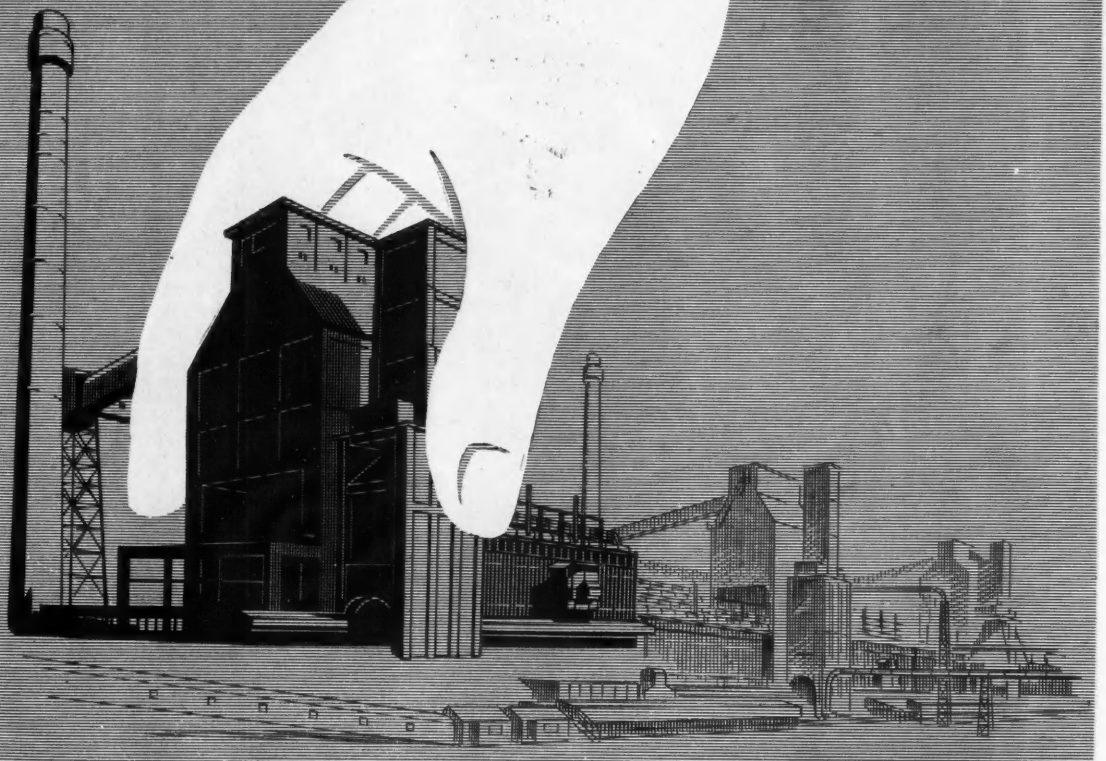
It might be significant that the limit of 55% mentioned for coke oven tar approximated to the system known as open packing, each sphere touching six others. Emulsions of this class with less than 55% water or of the other class with less than 74% water were usually unstable, and unless the tar was very viscous or the water drops were exceedingly small, would separate by creaming into a layer of maximum water content and a layer of reasonably water free tar. Partial or complete demulsification might then occur by coalescence of the water drops in the cream. Emulsions had been prepared in which the concentration of the dispersed phase was 99%, and the deformation of shape of the globules must be considerable. He did not think, however, that the water drops in the usual gasworks emulsions would stand much deformation without beginning to coalesce.

The difficulty was to bring about such deformation, and it might be said that a stable emulsion would always occur if the ordinary forces of differential hydrostatic pressure were insufficient to cause coalescence. The increased pressure brought about by a centrifuge was usually effective. This often failed as a continuous process owing to blockage of the bowl with solids, but in specially designed machines this difficulty had been overcome. He would ask the author whether it was this difficulty which rendered centrifuging ineffective at Ipswich.

Compression of the water drops could be effected by means of differential thermal contraction. Although in no way asso-

(*Concluded on p. 257*)

and now—the 5th battery



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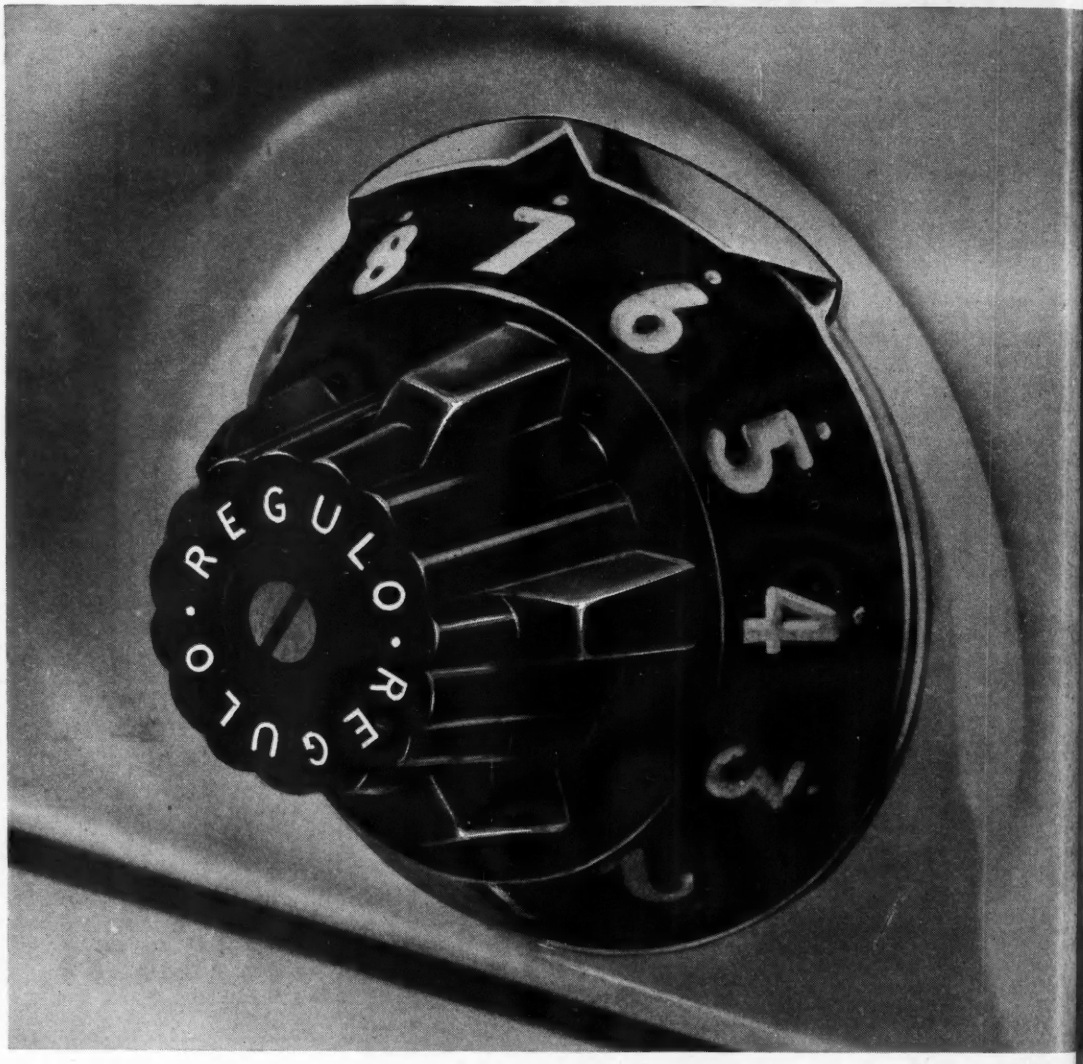

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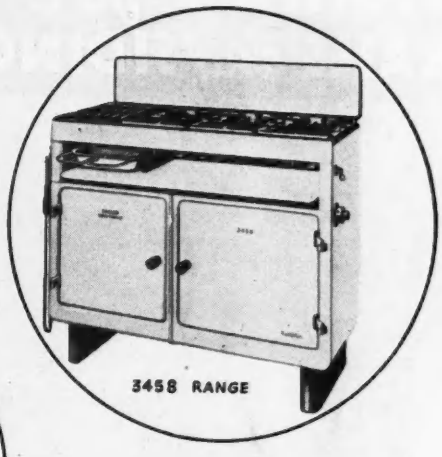

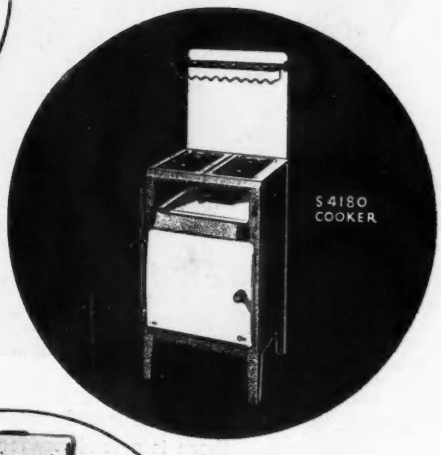

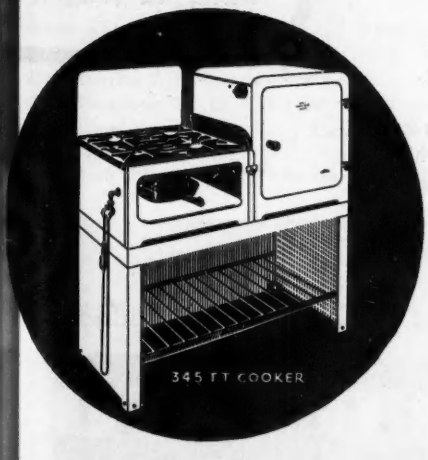

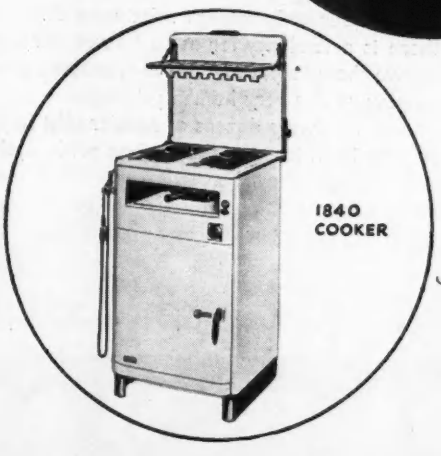

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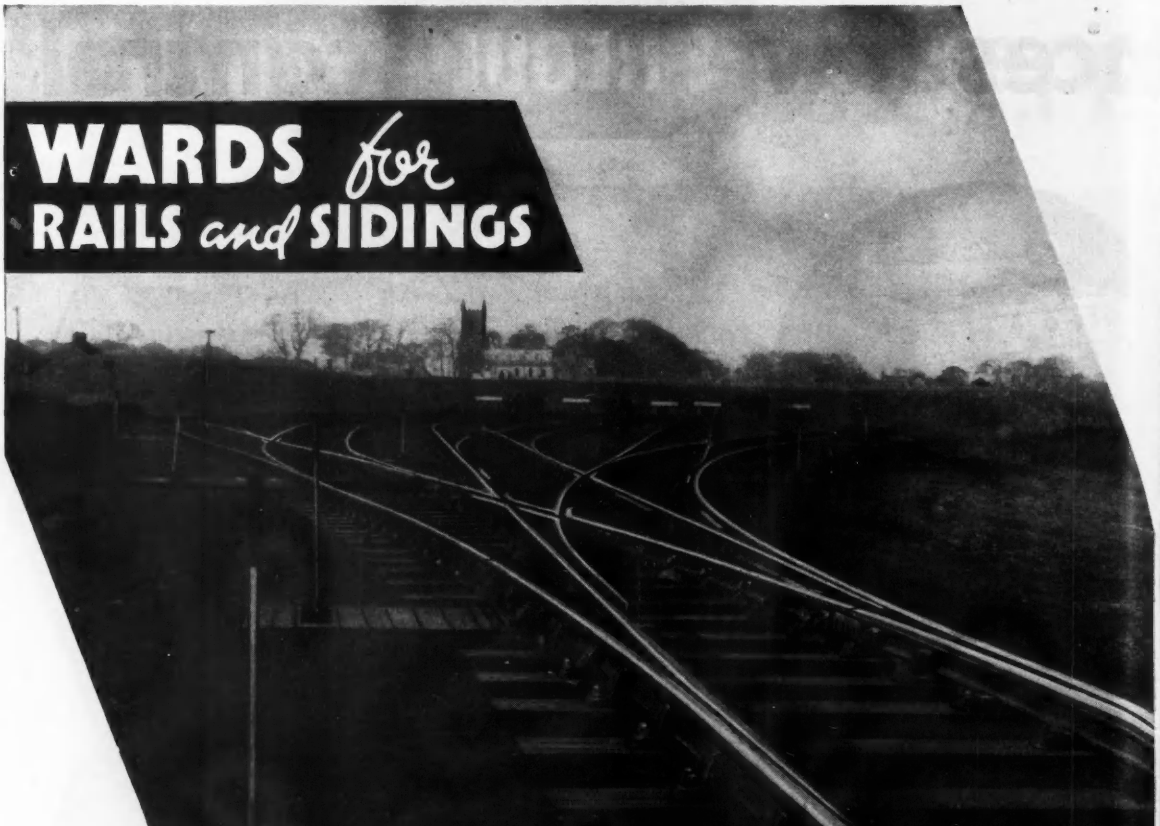

NCB The layout illustrated above shows a tandem turnout providing a ladder of sidings at the Primrose Hill Unit of the National Coal Board, by whose courtesy the photograph is reproduced.

Because we take a pride in our undertakings relative to their size and importance, there is a tendency for us to feature our bigger contracts whenever we choose a photograph to illustrate our work. Nobody would gainsay us this very human privilege.

Nevertheless, there are always dozens of smaller jobs in progress all over the country in which we take no less pride—jobs which, relatively small though they be, still carry the unmistakable stamp of planned construction which characterises every Ward-built siding, no matter what its size or complexity.

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SC/21

ciated with the development of this method, he mentioned it as it did not seem to be widely known.

The coefficient of expansion of carburetted water gas tar between 15°C. and 50°C. was greater than that of water. If an emulsion brought to maximum water content at 50°C. by storage in a heated tank, was rapidly cooled, the differential shrinkage of the tar envelope must bring about compression of the water drops. Partial demulsification of large batches of carburetted water gas tar had been effected by these means although the process was a little cumbersome.

The author has mentioned Amine 220 as being insoluble in water. Was it soluble in tar or merely dispersed therein. An agent soluble in tar would readily penetrate the continuous medium and might attack the emulsifying agent from the tar side. This may account for the outstanding success of Amine 220 at Ipswich. Teepol was readily soluble in water but is insoluble in tar oils, although it can be dispersed in them. It may be that agents of the Teepol type acted from the water side. The difficulty of introducing it into the dispersed drops was readily understood, and when it did bring about partial coalescence it was carried away in the separated water. The incautious use of larger quantities had sometimes produced from water in tar emulsions intractable emulsions of the reverse type.

These remarks applied to emulsions in general rather than sealing oil emulsion in particular. Emulsion problems could be very troublesome and the satisfaction of a successful solution as was obtained with the emulsion mentioned in the paper was correspondingly great.

As the author had mentioned, the behaviour of emulsions was highly specific. The underlying theory of their structure was, however, largely common to all types, and the application of agents of the Amine 220 type to other emulsions might be well worth trying.

Mr. Porter, in his reply, said it was true that if water and tar in a mixture passed through a gear type pump emulsification would be rapidly produced, but if there was no water going with the tar one was forced to look for the point of emulsification.

The point about the nature of the canvas seal was interesting and had not been overlooked. It was bound up with Mr. Wiseman's point about the relative solubility of Amine 220, which, according to the makers, was virtually insoluble in water. That was an advantage because it remained to a large extent in the tar and, being an organic substance, was soluble in tar. It acted from the tar side in modifying the forces at the interface between the tar carbon and the water. Teepol was soluble in water and at Ipswich they found it quite ineffective.

He agreed with the suggestion that anionic agents might be worth trying. It had been stressed by himself and others that emulsification was highly individual; what was good for one was not necessarily good for another, when to all intents and purposes the two were the same.

NORTHERN JUNIORS

THE annual general meeting of the Northern Junior Gas Association was held at the Park Hotel, Tynemouth, on Friday, June 27. The retiring President, Mr. J. McManus, referred with great regret to the absence of the President-Elect, Mr. R. Williamson (Sunderland), due to pressing family reasons. It was particularly unfortunate that Mr. Williamson was not present because he had looked forward to this day with great anticipation and his disappointment was very great. In the circumstances, the Senior Vice-President, Mr. Stanley Jones (Middlesbrough) took the chair.

The Hon. Treasurer's Statement of Accounts was received and showed a surplus of income over expenditure for the year of £53 16s. The report of the Transactions Secretary included a request that more members should avail themselves of the opportunity of purchasing copies of the Transactions, particularly in view of the fact that a lower price had been arranged.

Mr. J. E. McManus presented his Presidential Address and a vote of thanks was proposed by Mr. W. Sutcliffe (Blyth).

The election of officers for the ensuing year was as follows:

President: R. Williamson (Sunderland).

Senior Vice-President: S. Jones (Middlesbrough).

Junior Vice-President: T. R. Wicks (Workington).

Hon. Secretary: R. Aynsley (Newcastle).

Hon. Treasurer: W. O. Kirkwood (Sunderland).

Hon. Transactions and Publicity Secretary: S. Jones (Middlesbrough).

Hon. Auditors: A. O. Old (West Hartlepool), D. Yule (South Shields).

New Members of Council: J. C. Graham (Gateshead) and S. A. Tait (Barnard Castle).

Northern District Education Committee: W. O. Kirkwood (Sunderland), F. J. Webster (West Hartlepool), C. Hindle (Darlington) and R. Aynsley (Newcastle).

The Society of British Gas Industries Silver Medal was presented to Mr. D. P. Dalby (Morpeth) for his paper on 'The Care and Maintenance of Gasholders.' Mr. Jones presented the Certificate of Office to the retiring President, and a vote of thanks to the President and officers was proposed by Mr. G. E. Haddon (Stockton); Mr. Aynsley, the Hon. Secretary of the Association, responded.

This concluded the morning meeting which was followed by lunch, after which Mr. Jones introduced Mr. G. E. Anderson, Chairman of the North of England Section of the Institution of Gas Engineers, who, in the absence of Mr. J. E. White (Divisional General Manager of the Newcastle Division of the Northern Gas Board) acted as host. Mr. Anderson welcomed members of the Association to Tynemouth and referred to the cordial relations which existed between his Association and the Northern Juniors. After lunch members visited the Howdon works of the Newcastle Division, under the personal guidance of Mr. McManus, who is Works Manager at Howdon. The 8 mill. cu.ft. per day I.V.C. installation which had only recently been put to work was of considerable interest, and since Howdon is virtually a new works, almost in its entirety, the inspection proved most instructive.

At the conclusion of the visit, members were entertained at tea in the works canteen and a vote of thanks to Mr. J. E. White and to the Northern Gas Board was proposed by Mr. S. A. Tait.

Members of the Northern Junior Gas Association outside the Park Hotel, Tynemouth.

TRADE NEWS

Telcon Metals Division

The Directors of the Telegraph Construction and Maintenance Co., Ltd., announce that arrangements are being made to move their metals division from Telcon Works, Greenwich, to Crawley New Town, where it is proposed to build a new factory for the production of special alloys. The move has been necessitated by the need for expansion to meet the increasing demand and will double the present productive capacity. The first stage of the removal is not likely to take place for about 18 months.

Geo. W. King

Two new hoisting blocks have been added by Geo. W. King, Ltd., of Hitchin and Stevenage, to their wide range of lifting and shifting equipment. One is a new sack hoist with a lifting capacity of 250 lb. and a speed of 75 ft. per minute. This is an adaptation of King's famous My-Te-Min, supplied with one or two hooks as required with hook or trolley suspension; powered by a ¼ h.p. 3,000 r.p.m. motor. It is ideal for those who require fast and economical sack hoisting. There are several patented features illustrated on a leaflet just issued. The other new addition is the Bantam II lightweight hand chain block, which weighs only 29 lb. and lifts half a ton without effort. It is a small hoist with a big capacity. It is light, easily transportable, compact, with minimum headroom; very sturdy and needs little maintenance. Leaflets concerning both new blocks are available from the makers.—*Geo. W. King, Ltd., Hitchin and Stevenage, Herts.*

Crane Packing

With plant handling sulphuric acid in varying concentrations it is difficult satisfactorily to seal off the glands of pumps, due to the inability of most gland packings to withstand the corrosive action to which they are exposed in such services.

Some months ago a combination assembly of gland packings which was supplied by Crane Packing, Ltd., was installed in a pump handling sulphuric acid with results so successful that they are worthy of comment. The main gland of the pump was packed with an assembly of CF2 packings consisting of alternate rings of styles 4SMG and 4GL with the former used as headers, and the pilot gland was packed with rings of 'Cranpac' style 896, also manufactured by Crane. So far, this assembly of packings has given over seven months trouble-free service.

The CF2 range of packings which was introduced by Crane about two years ago is based upon a chemically inert polymerised plastic material, polytetrafluoroethylene. This range of packings is immune to the corrosive action of all known acids and chemicals. 'Cranpac' style 896 is a braided asbestos packing impregnated with a high temperature and acid resistant lubricant. This packing has been used on acid services for many years, but since the introduction of the CF2 range it has been largely superseded, at any rate as a main packing, when acids or chemicals of a very corrosive nature are being handled.

The firm has recently issued a special booklet devoted to gland packings for the chemical industry which is available to interested firms and individuals.—*Crane Packing, Ltd., Slough.*

WALTER KING PHOTOS

For the week commencing August 18 Walter King's Photographer will be travelling to the following places: Birmingham, Manchester, Bradford, Chesterfield, Leeds, Brighton, Dover, and some of the gasworks in the London area. He will be pleased to accept commissions at or near these places. Enquiries should be addressed to the *Gas Journal* offices.

Donald Ross & Partners

Two new Twinner tools—a pipe expander and an internal pipe aligner—are designed to remove the problem of maintaining a true roundness during preparation for and butt welding of pipe line sections. Modern welded pipelines need to be constructed from pipe sections which are exactly internally aligned. As all pipes suffer from varying degrees of ovality, mechanical aids are necessary to ensure that pipes are held truly round so that perfect flame cut bevels can be produced, and to hold the pipes in perfect internal alignment while the butt welds are being made. Twinner pipe expanders are used to press out the walls of a pipe to a truly round form. When in place, an oxy-acetylene pipe cutter is turned round the pipe to make the desired bevel. When the pipe expander is removed the pipe walls usually return to their original ovality, thus, when the pipes are offered together for butt welding, it is necessary to press the walls of the pipes out again to the truly round shape from the inside. For this purpose a Twinner internal pipe aligner is used. Both tools are made to suit any individual size of pipe from 6 in. upwards.

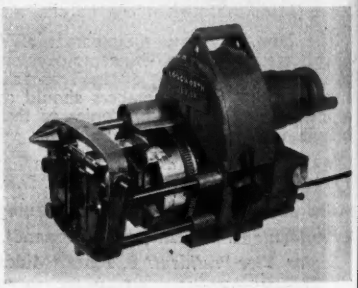
While primarily intended as an aid to cutting accurate pipe bevels, the pipe expander is also useful as a general purpose tool for holding cylindrical objects truly round while flanges or other fittings are welded on. The tool is of special interest where welding of thin gauge metals presents problems in holding and avoiding distortion.—*Donald Ross & Partners, Ltd., 1/3, Arlington Road, London, N.W.1.*

W. J. L. Machinery, Ltd.

A newcomer in the field of pipe screwing was recently demonstrated in Westminster to an interested gathering of engineers and representatives of the Technical Press. The machine is the Longworth 'Junior' portable electric pipe screwing machine, designed and produced by W. J. L. (Machinery), Ltd., of Dacre House, Westminster, and Apley Works, Burford Road, Witney, Oxon. Mr. W. J. Longworth, Managing Director of the Company, emphasised the fact that the object of the company producing this machine was to achieve portability without the sacrifice of the other essentials in such a machine of ruggedness, low power consumption, and accuracy.

The machine, in brief, comprises a motor driven die head in which are accomodated four tangential chasers mounted on a common base with a quick acting compound vice. The feed of the die head is controlled by a master screw embodied in the gear box, and the dies automatically open at the end of the prearranged traverse of the machine.

The capacity is for standard pipes up to 2 in. diameter. Parallel threads of any length and taper threads up to the width of the chasers employed may be cut, speed of operation being 11 threads per minute up to ¾ in. diameter and five threads per minute on the larger sizes. The lead screw and follower and the chasers are capable of being changed in short time by an operator with a modicum of skill when it is necessary to change over from 14 t.p.i. to 11 t.p.i. Chasers and lead screws for B.S.P. parallel threads of both these t.p.i. are provided as standard equipment, but chasers and lead screws to suit other pitches of B.S.P. and conduit threads can be supplied. A conical de-burring cutter is fitted on the end of the drive shaft and a grinding wheel for sharpening cutters is mounted on the driving shaft, a fixture being mounted on the shafts to give a correct angle for re-grinding chasers.



The Longworth 'Junior' portable electric pipe screwing machine.

The essential feature of the machine is its portability—it weighs 80 lb. and the universal motor has a power consumption of only 150 watts. The machine is fully patented.—*W. J. L. (Machinery), Ltd., Dacre House, Dean Farrar Street, London, S.W.1.*

(*Trade News continued on p. 263*)

Summersons Book of Railway Sidings

It's 72 pages include blueprints, photographs, special designs, complicated layouts, railway accessories, glossary of railway siding terms, etc.

It is fitting that Summersons, the world's oldest railway siding engineers, should publish this comprehensive catalogue of railway siding designs, installations and accessories. The 72 pages include numerous blueprints and photographs of crossings, switches and turnouts, with examples of complicated and special designs, road rail layouts and large scale platelaying. Drawings and illustrations of numerous accessories are also included together with a complete and illustrated glossary of railway siding terms. If you operate railway sidings, this book is a vital adjunct to your drawing office. *Send for it, it's yours for the asking.*

THOMAS SUMMERSON & SONS LTD., ALBERT HILL, DARLINGTON. TELEPHONE: DARLINGTON 5226

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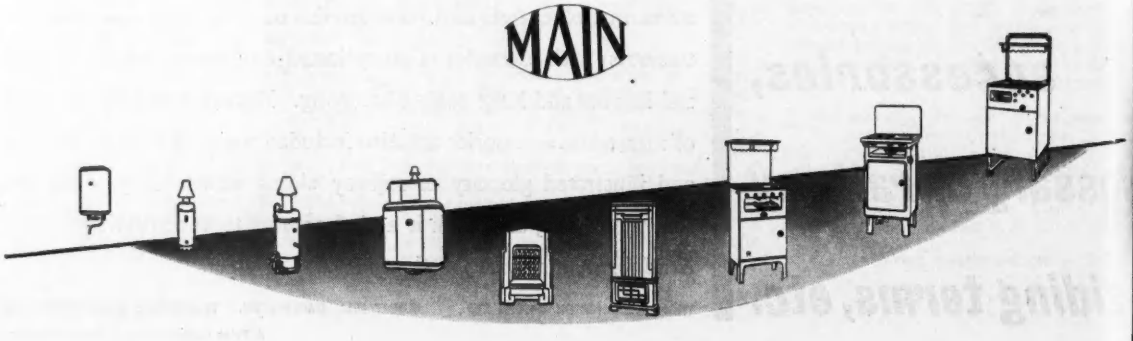


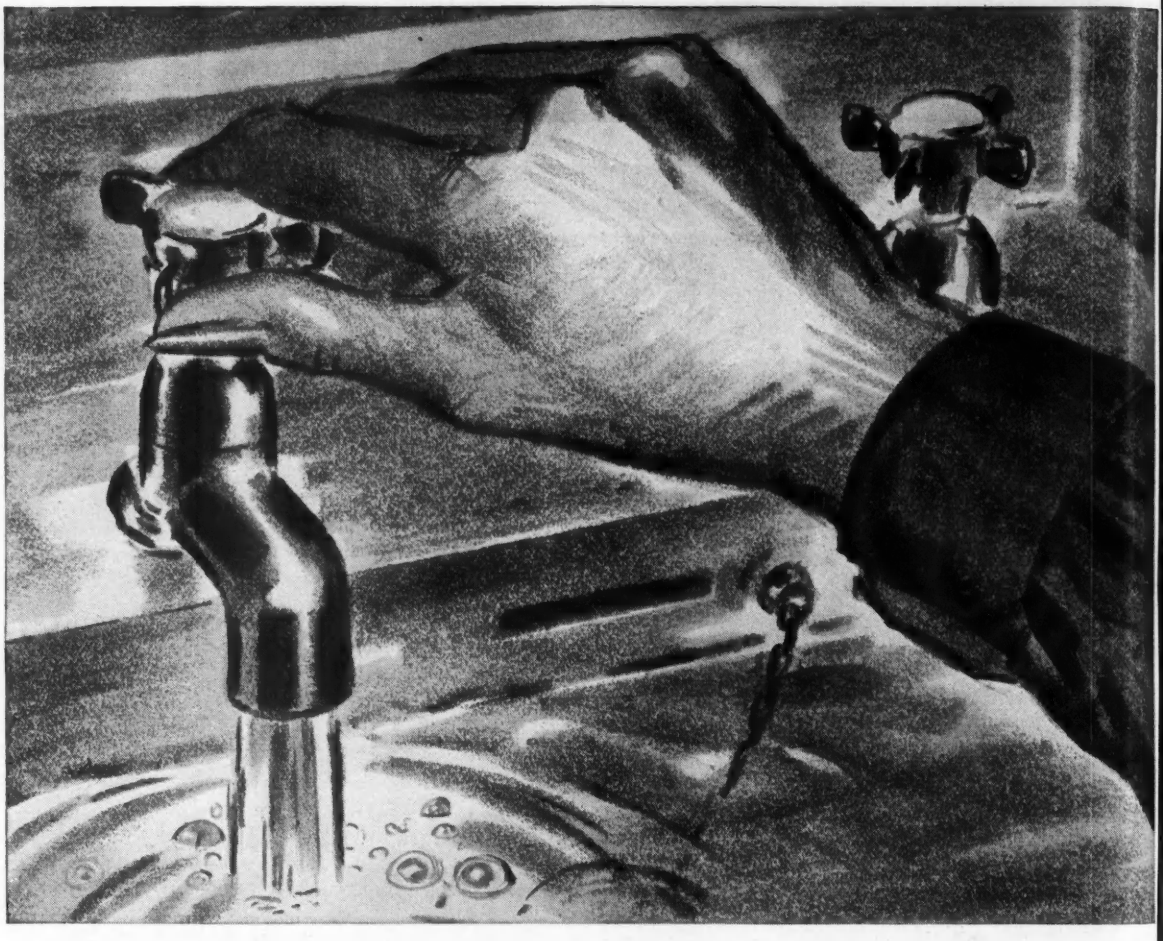
ion IN GAS APPLIANCE MANUFACTURE

Examination of grill covers prior to release for enamelling.

preparation and inspection of castings Castings have already passed a searching test in the foundry before they are subjected to the various cleaning up processes, preparatory to covering with vitreous enamel or other finish. Here, again, the accent is on careful examination of every single casting before it may be handed on to another department of the factory for further attention.

Gas rails being checked—this close examination applies to every kind of casting

MT/551



Efficiency that you take for granted...

Turn on your tap. Out gushes water. Have you ever thought of what happens to water between the river and your tap? Do you know how pathogenic bacteria is abstracted? Have you ever heard of a roughing filter bed or a slow sand bed? How long must the chlorination process last to ensure sterility? You know nothing of these things. You take it for granted that the water in your house is as pure as it possibly can be.

That is how most engineers look upon Wakefield Lubricants. They know that scientific research has made them as near perfect as human ingenuity can devise. Their quality is taken for granted. Many Wakefield customers know the best way to reduce operating costs while increasing efficiency is to specify Wakefield Lubricants and use to the full the facilities of the Wakefield Industrial Lubrication Service.

C. C. WAKEFIELD & CO. LTD • GROSVENOR STREET • LONDON • W.1

TRADE NEWS—Continued.

Rheostatic Company

Development and field trials having been completed, the Rheostatic Co., Ltd., is now producing a photo-electric protective device which is sensitive to the flame of automatic and semi-automatic oil burners. The application of a photo-electric cell to oil burner flames is not new but in developing the 'Satchwell' type the makers have had in mind the necessity for producing a device which will prevent operation of the oil burner not only on non-establishment of the flame during starting or failure of the flame during running, but also on the occurrence of those troubles which are likely to occur even with well managed installations.

The device is designed to stop the oil burner if the flame is not established during the starting operation and also to stop it should there be a failure of the flame for any reason during a normal run. In addition to these occurrences, the oil burner will be stopped should either the photo-electric cell or the amplifying valve be broken; if one of the external electrical connections to the device is broken or otherwise open circuited; if a path of low resistance is created between the terminals of the photo-electric cell caused, for instance, by operation in an exceedingly dirty boiler house; or if an electrical short circuit develops across the terminals of the photo-electric cell by damage or otherwise.—*The Rheostatic Co., Ltd., Slough, Bucks.*

Ewart & Son

In co-operation with the Wales Gas Board, the Research Department of Ewart & Son, Ltd. supplied No. 30 bath water heaters with special butane/air

The Ewart No. 30 bath water heater fitted with special burner for heating by butane/air, as installed at Whitland.

burners on the area of the Whitland gas undertaking when the change-over was made by this undertaking from coal gas to butane/air. These are giving very satisfactory results.—*Ewart & Son, Limited, 35, Kentish Town Road, London, N.W.1.*

Radiation Ltd.

Our photograph shows a 'Newlyn' water heater fitted in the bar of one of the Butler Houses (W. Butler & Co., Ltd., the Wolverhampton brewers). This type of storage heater, with a

storage capacity of 2 gal., will give about 5 gal. of hot water (raised through 80°F.) hourly. The 'Newlyn' is installed in a large number of Butler houses throughout the Midlands.

General Electric Co.

Weatherproof and flameproof, a new battery torch made by the General Electric Co., Ltd., has been designed to operate with safety in mines, cellulose-spraying plants, garages petrol establishments, gasworks, and oil tankers, It carries Ministry of Fuel and Power and Home Office certificates for use in situations where methane, petroleum vapour, acetone, or town gas may be present.

The case is strongly made of cast aluminium alloy, the interior being treated with an anti-corrosive preparation. Armour plate glass forms the front lens, which is cemented in a screwed ring (eliminating rubber gaskets and protected by two stainless steel blades. The long-wearing labyrinth switch affords easy action with safety. A hexagonal head prevents rolling when the torch is laid on its side. This head is secured by a latch, which can be locked against unauthorised interference by a lead seal or plug. A suspending ring is fitted to the tail of the case. The 3.5 V 0.3 amp Osram bulb is carried in a separate holder with a spring contact that obviates any crushing of the contact pip against the battery. This bulb-holder can be adjusted in relation to the reflector to give either a flood or spot light.—*General Electric Co., Ltd., Kingsway, W.C.2.*

Trade Publications

We have received a copy of a comprehensive booklet published by Frederick Kay (Engineering), Ltd., Nash-leigh Works, Chesham, Bucks, dealing with the firm's 'Kayenco' gas boilers for central heating and hot water supply. Full information on the 'Fifty-two' Series of boilers is given, including assembly instructions, operational details, and notes on flue equipment.

We also acknowledge with thanks the following:—

The BUTTERLEY CO., LTD. — The Spring Number of the firm's house organ *Ad Rem.*

AUTOMOTIVE PRODUCTS CO., LTD.—The firm's house organ, *Precision,* for June (No. 6, Vol. 7).

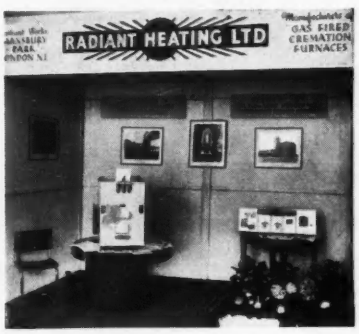
BRITISH ROPES, LTD.—No. 27 of *Rope Talks* containing, among other articles, a story on 'Cheating the Sea of its Prey,' an account of the exploits of the 'Turmoil,' the rescue tug that tried to bring the 'Flying Enterprise' into harbour.

STEELS ENGINEERING PRODUCTS, LTD.—A new brochure on the solving of materials handling problems by 'Electric Eel' industrial trucks and tractors, together with specifications and duties of Coles electric grabs—hand geared and electric travel.

GENERAL ELECTRIC CO., LTD.—A catalogue No. 1492, 'Flameproof and Safety Equipment,' bringing together descriptions of a wide variety of electrical equipment suitable for use where hazard may be present and where every possible precaution must be taken to reduce risk to a minimum.

KEITH BLACKMAN, LTD.—Publication No. 27, giving details of 'Tornado' axial (ring mounted) fans. This catalogue covers the complete range of axial fans with four aerofoil section blades and with 6 in. to 16 in. diameter wheels for operating (a) under free inlet and discharge conditions and (b) against moderate resistance conditions.

Trade Publications continued on p. 265.



Our photograph shows the stand of Radiant Heating, Ltd., at the recent conference held by the Cremation Society at Margate. A model of the gas fired cremator, manufactured by Radiant Heating, Ltd., was on view on the stand and photographs were shown of the crematorium at Kingston-on-Thames where two Radiant Heating cremators have recently been installed.

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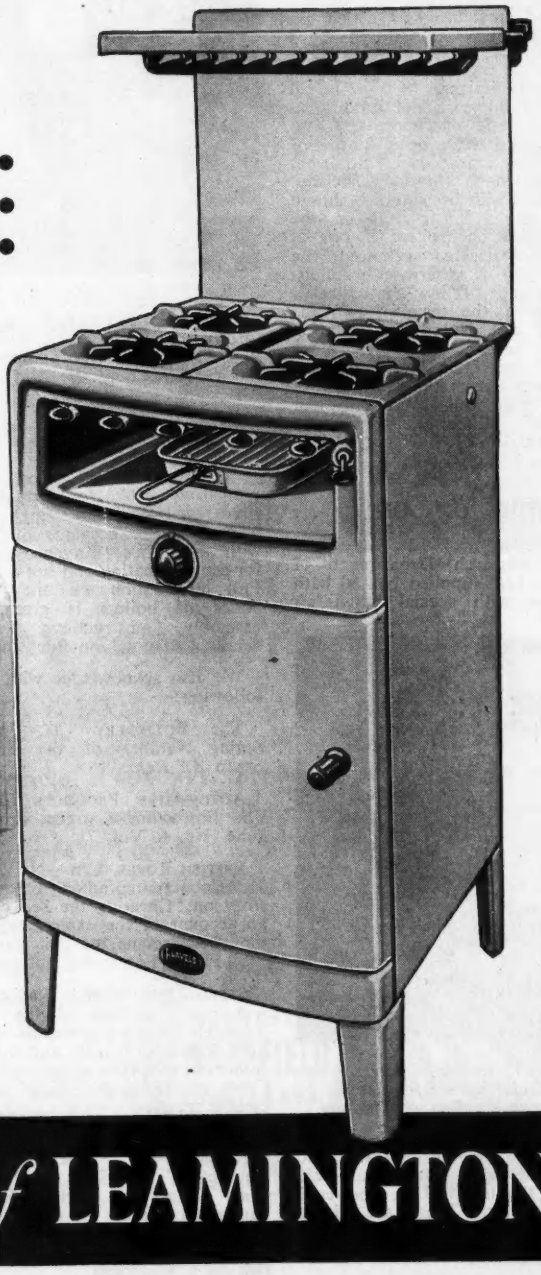

FLAVELS *of* LEAMINGTON

MAKERS OF FINE QUALITY COOKING & HEATING APPLIANCES SINCE 177

TRADE PUBLICATIONS — Continued

BROOM & WADE, LTD.—*Broomwade News Bulletin* for May-June, describing among other developments the air-operated clamping fixtures in the company's own new works extension.

BARDSLEYS-COLCHESTER, LTD.—A new catalogue of ladders, barrows, trucks, and other equipment just issued for the home market. The reference number is B/C 1952/120 and supplies are available for genuinely interested enquirers.

LANCASHIRE DYNAMO.—*Behind the Symbol* is the title of a new leaflet (ref. ML.73) which has been issued by Lancashire Dynamo & Crypto (Mfg.), Ltd., 94, Petty France, London, S.W.1. The L.D.C. shield, a characteristic feature of every Lancashire Dynamo motor, has been described in many earlier leaflets and elsewhere, as 'A Symbol of Power in Industry.' This latest brochure aims to show, pictorially, a few aspects of 'behind the scene' activity at L.D.C. works—to go, in fact, behind the symbol.

G. A. HARVEY & CO. (LONDON), LTD.—The June issue of the *Harvey Magazine*, featuring some changes, including a new 'Women's Page.'

W. H. ALLEN, SONS, & CO., LTD.—The July issue of the *Allen Engineering Review*, featuring a description of high efficiency turbo-alternators for gasworks service as installed for the North Thames Gas Board at Beckton, and for the South Western Gas Board at Gloucester.

COMPANY NEWS

GEORGE COHEN

Final ordinary dividend of George Cohen, Sons & Co., Ltd., 18% (15%), making total for year to March 31, 1952, 26% (23%). Combined profits of group, subject to taxation, £1,825,770—an increase of £957,685. Net profit £714,270 (£342,232), of which the parent company's share £704,019 (£331,983). Group carry forward is increased from £199,260 to £586,581. The directors state that the exceptionally favourable trading conditions of the past year are not expected to continue throughout the current year.

UNITED GAS INDUSTRIES

Final dividend 12% (same) on ordinary, making 17% (same), and dividend 1s. 9d. (same) per share on 1s. deferred for year ended March 31, 1952. Group profit, after all charges, including tax and provision of £21,169 (nil) for repair of meters and £5,256 tax adjustment credit, was £215,405 (£182,616)—all attributable to holding company. Income tax charged was £339,326 (£278,979). Preference dividend £20,183 (£21,144), ordinary 5% interim £17,912 (£18,765), 12% final £42,987 (same), deferred dividend £25,078 (same). To general reserve nil (£25,000), plant replacement £80,000 (nil), forward £546,020 (£516,775).

COALITE & CHEMICAL

Profit for the year ended March 31, 1952, together with income from investments as disclosed by the consolidated profit and loss account, provides a balance of £713,029. From this must be deducted depreciation £93,369, auditors' remuneration £666, interest on debenture stocks £14,905, taxation £338,537, and profits retained by subsidiaries £7,511, leaving a net profit for the year of £258,041 (£174,208) giving, with the sum of £111,488 brought forward from last year, a total of £369,529 available for appropriation. The following appropriations are proposed: Interim dividend of 3% (less tax) which has already been declared and paid £25,251; transfer to general reserve account £175,000; final dividend of 5% (less tax) on the ordinary stock £42,085; leaving a balance to be carried forward of £127,193. The consolidated balance sheet discloses a surplus of current assets over current liabilities of £1,174,483, while capital and revenue reserves total £1,020,374.

GUERNSEY

The Directors of the Guernsey Gas Light Company present the annual accounts for the year ended March 31, 1952, which show a profit of just over £11,000 on the year's working. The balance at credit of profit and loss account amounts to £18,028. The Directors have fixed the dividend for this year at 5%. This will absorb £10,000, leaving a balance of £8,028 to carry forward. The gross sale of gas during the year was 330,676,100 cu.ft., a decrease of 16,272,100 cu.ft. on the previous year, mainly due to the exceptionally mild winter.

KEITH BLACKMAN

Profit for the year, after charging all expenses and making provision for depreciation, Directors' fees, etc., was £322,272 (£238,170), making with the balance brought forward from last year £412,614. Appropriations already made or recommended are as follows: Provision for taxation, £200,000; transfer to general reserve, £75,000; transfer to reserve for pensions, £15,000; dividend on preference shares, £5,775; proposed dividend of 25% on ordinary shares, £39,375; leaving to be carried forward £77,464. The sum of £25,000 has been transferred from reserve for foundry reconstruction to reserve for future stock depreciation by reason of the fact that current legislation precludes the Company from proceeding with the rebuilding project originally contemplated.

I.C. GAS

Mr. Justice Wynn-Parry in the Chancery Division on July 21 confirmed a reduction of the capital of the Imperial Continental Gas Association from £5,600,000 to £4,480,000 by returning capital in excess of the wants of the Association. Mr. M. Wheeler, for the Association, said that it had £1,120,000 in excess of its wants and this could not be usefully employed by the Association It owned a large number of gas, electricity and associated companies in France and Belgium. The French companies had been nationalised, and the Association had received substantial sums by way of compensation. As that £1,120,000 could not be usefully employed by the Association it was desired to repay this sum to the stockholders. Following the reduction, the capital was to be restored to the original amount by the creation of new shares.

HORSELEY BRIDGE

Horseley Bridge and Thomas Piggott, Ltd., constructional engineers, announce a trading profit of £289,066 for the nine months to March 31, compared with £291,997 for the previous year. With income from investments £5,200 (£8,389), the total is raised to £294,266 (£300,386). After depreciation £19,430 (£24,728), taxation £152,000 (£141,500), etc, the net profit is £111,242 (£119,429), to which is added tax provisions no longer required £90,000 (nil), including £60,000 (nil) future income tax released owing to the change in the accounting date. A dividend of 15% is recommended for the nine months, equivalent to a rate of 20% per annum, on the ordinary capital of £370,000 as increased by the 140,000 new ordinary 10s. shares issued under the terms of Carter-Horseley (Engineers). This compares with a dividend for the previous 12 months of 15% and the special distribution of 5%, making a total of 20%, on £300,000. General reserve receives £85,000 (£65,000), tax equalisation account nil (£35,000), plant replacement reserve £40,000 (nil), and the carry-forward is £104,711 (£53,788).

ALLIED IRONFOUNDERS

The 23rd annual general meeting of Allied Ironfounders, Ltd., was held at Caxton Hall, Westminster, S.W.1, on July 24—Mr. James Shaw (Chairman and Managing Director) presiding. In the course of his statement, the Chairman said the trading profit of the group, as shown by the consolidated profit and loss account, amounted to £2,077,989 (last year £1,926,276). Investment income was £90,949. They had to charge £212,861 for depreciation and £37,134 for directors' fees and commission and an exceptional item of £174,925 for past service benefits under the pension scheme. This left £1,801,377 (last year £1,860,703), of which taxation took £1,078,618 (last year £1,018,003), and the balance of £722,759 (last year £842,700) was available for reserves and dividends. The chairman foreshadowed the introduction next autumn of two new solid fuel economy appliances both of which would be suitable for installation in both existing and new homes. As regards the production of gas appliances, while the works had been profitably employed, demand had been influenced by national policy and production restricted by limited material supplies.

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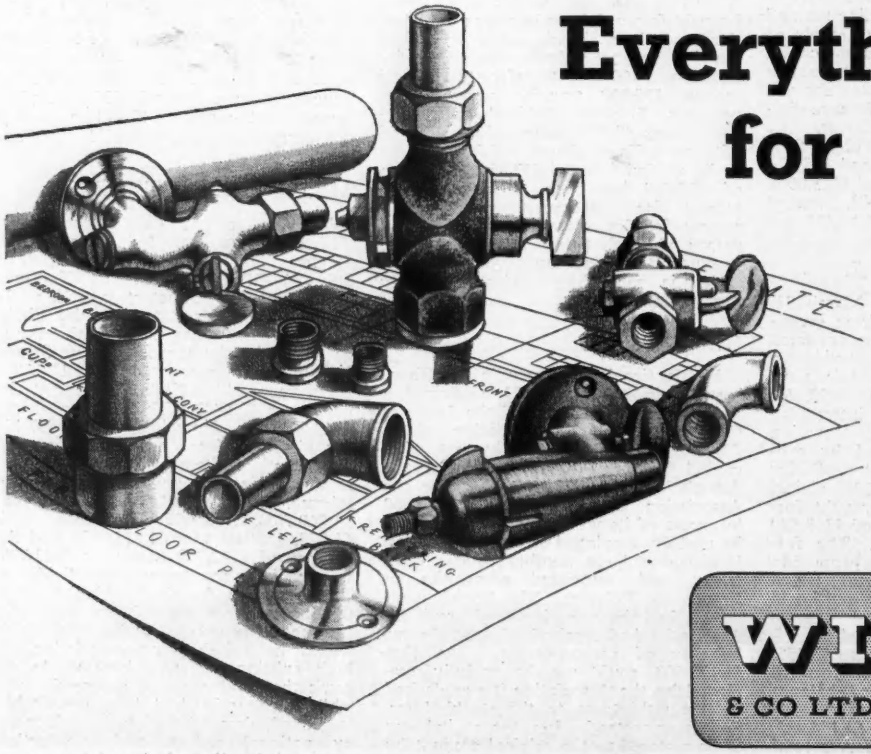

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The "Gas Journal" has existed as an integral part of the Gas Industry since 1849. Unbiased policy, technical knowledge, accuracy and reliability combine with an extensive news service and modern make-up to make the Journal the leading Gas Industry newspaper.

Annual Subscription (including a copy of the "Gas Journal" Calendar and Directory): Home and Empire, **52s.** ; Foreign, **60s.**

GAS SERVICE. *(Monthly.* By Post, **1s. 2d.)**

"Gas Service" is the specialist magazine for the Sales and Service personnel of the Industry. It covers all aspects of gas service from the holder to the burner. In addition to sound editorials, news items and specially contributed articles, "Gas Service" also reports in the fullest possible manner the activities of the numerous Salesmen's Circles.

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BOOKS and ANNUALS . . .

Some current works covering the manufacture, distribution, and sale of gas are :—

KING'S MANUAL OF GAS MANUFACTURE. Now being issued in 10 self-contained sections. Full details of the sections ready and prices, are published regularly in the "Gas Journal" in a separate announcement.

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ANNUALS:—

"Gas Journal" Calendar and Directory, 25s. ; "Gas Service" Pocket Book 4s.

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In addition to permanently binding subscribers' journals, (particulars and prices for which we shall be pleased to give on application) we can supply TEMPORARY BINDERS for the Gas Journal, Gas Service and King's Manual of Gas Manufacture, thus enabling readers to *bind their copies as received.* The danger of mislaid or damaged copies is eliminated.

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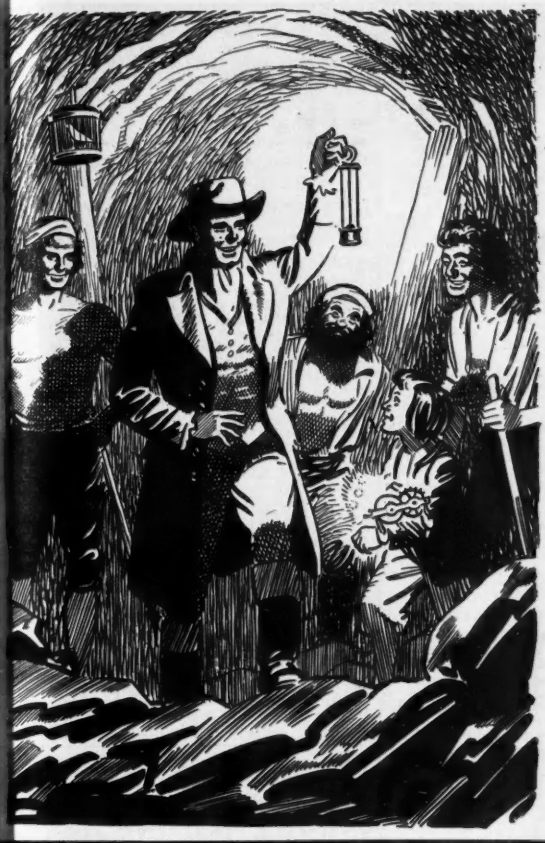

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Our liners ply the seas;
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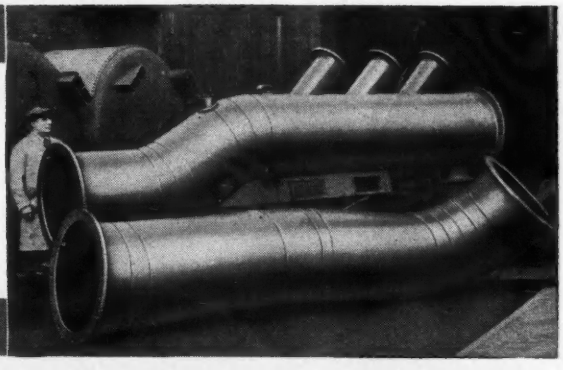

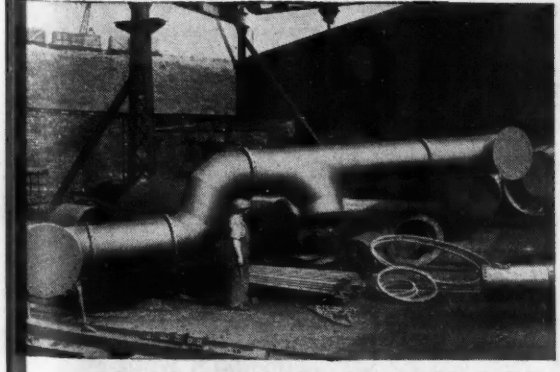

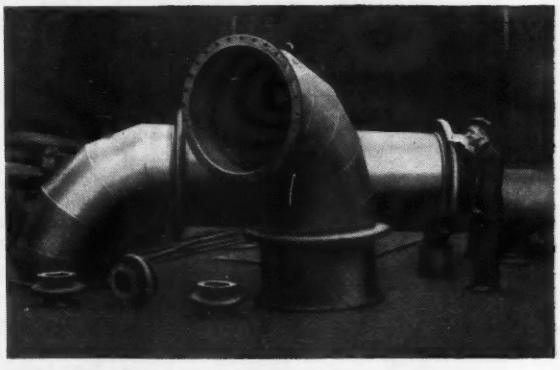

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

NORTH WESTERN GAS BOARD

BURNLEY-COLNE GROUP

SHOWROOM MANAGER—

BURNLEY SHOWROOMS

APPLICATIONS are invited from suitably qualified persons for the above position at a salary within Grade A.P.T. VII (£525-£605 per annum).

Applicants must have had experience of showroom supervision and sales of appliances, and preference will be given to holders of the Institution of Gas Engineers' Certificate in Gas Salesmanship and Consumer Service.

The successful applicant may be required to pass a medical examination and to subscribe to such superannuation scheme as the Board may adopt.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (Burnley-Colne Group), Parker Lane, Burnley, within fourteen days.

NORTH WESTERN GAS BOARD

BLACKBURN GROUP

WORKS SUPERINTENDENT—

GREENBANK WORKS, BLACKBURN.

APPLICATIONS from suitably qualified persons are invited for the above position at a salary within Grade A.P.T. XII (£720-£845 per annum).

Applicants should possess the Higher Grade Engineering (Manufacture) Certificate of the Institution of Gas Engineers, and should have experience of the operation of continuous vertical retorts and carburetted water gas plants. The person appointed will be responsible to the Station Engineer for the efficient operation and maintenance of this Works, which has a present capacity of 9 million cu. ft. per day.

The successful applicant may be required to pass a medical examination and to subscribe to such superannuation scheme as the Board may adopt.

Detailed applications, giving the names of two referees, should reach the General Manager, North Western Gas Board (Blackburn Group), Cardwell Place, Blackburn, within fourteen days.

REFRACTORIES TECHNOLOGIST required to act as DEPUTY to Chief Inspector of Refractory Materials. Qualifications should include a good general knowledge of :—(1) Chemistry and Physics, (2) The manufacture and properties of firebricks and silica bricks. Works' experience would be desirable although not essential, (3) Laboratory tests on ceramic materials in general. Apply giving details of age, which should not exceed 35 years, qualifications and experience, together with salary required to : The Personnel Officer, The Woodall-Duckham Co., 63/77, Brompton Road, London, S.W.3.

PORTSMOUTH, GOSPORT AND BOGNOR REGIS GAS UNDERTAKING

SOUTHERN GAS BOARD

CARBONISING SUPERINTENDENT

APPLICATIONS are invited for the position of CARBONISING SUPERINTENDENT in the Portsmouth Group of Undertakings.

The successful applicant will be in control of the carbonising plant at Hilsea Gas Works (capacity 12 million cu. ft. per day), and be responsible to the Works Superintendent, while he will also act in an advisory capacity to the Superintendents of the other Gas Works in the Group on matters of carbonising practice and plant repair. It is desirable that applicants should be corporate members of the Institution of Gas Engineers and preference will be given to candidates with detailed operating experience of Intermittent Vertical Chambers and Continuous Vertical Retorts using Durham coals.

The commencing salary will be within Scale A.P.T. II (£670 to £795 per annum for a Category 'A' Undertaking), while the successful candidate will be required to pass a medical examination and, if not a member of an existing Pension Scheme, to become subject to the provisions of any Superannuation Scheme which the Board may introduce.

A Board's house will become available in some twelve months' time at a reasonable rental.

Applications, stating age, qualification, present position and experience, together with the names of two referees, should be sent to the undersigned to reach him not later than Saturday, August 16, 1952.

H. M. LAWRENCE,
General Manager.

Portsmouth, Gosport & Bognor Regis
Gas Undertaking,
The Square,
Portsmouth,
Hants.

WEST MIDLANDS GAS BOARD

REDDITCH DISTRICT

MECHANICAL PLANT SUPERINTENDENT

APPLICATIONS are invited from suitably qualified persons for the above appointment.

Candidates should have considerable practical experience in Mechanical Engineering, and corporate membership of the Institution of Mechanical Engineers or similar professional body, or the possession of a National Certificate in Mechanical Engineering will be an advantage.

The successful candidate will be responsible to the Works Superintendent for the inspection, maintenance and repair of all mechanical plant, including steam, water, gas and electricity services. He should be familiar with the Factories Acts and will be expected to maintain all records required under the Acts.

The salary for the post will be not less than £525 per annum, rising to a maximum of £605 per annum, in accordance with Grade 7 of the salary scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and the successful applicant may be required to pass a medical examination.

Applications, stating age, qualifications and experience and accompanied by the names of two referees, should be addressed to Mr. C. F. W. Rendle, Divisional General Manager, West Midlands Gas Board, Worcestershire-Herefordshire Division, 12, St. Nicholas Street, Worcester, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

EAST MIDLANDS GAS BOARD

LINCOLN GROUP

MAINS & SERVICES SUPERINTENDENT

APPLICATIONS are invited from suitably qualified persons for the appointment of Mains and Services Superintendent at Lincoln. Applicants must be experienced in High and Low Pressure Gas Distribution and should preferably possess the Institution of Gas Engineers Higher Grade Certificate in Gas Supply.

The appointment will be made within grade A.P.T. VII (£525-£605). The post is superannuable and the successful candidate may be required to undergo a medical examination.

Applications, stating age, experience, particulars of training and qualifications, together with the names of two referees, to be addressed to the undersigned for receipt not later than 6th August, 1952.

BERNARD CLARKE,
Divisional General Manager.

East Midlands Gas Board,
Lincolnshire Division,
Carholme Road,
Lincoln.

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(*c*) 75 SQUARE LANTERNS complete with burners and frogs.
(*d*) 35 Avil SUSPENSION LAMPS, 1 and 2 light, complete with swan necks in moderate condition.

The lamps, etc., may be inspected by arrangement with the Council's Engineer and Surveyor. Consideration will be given to sale in lots to purchaser's requirements.

Offers, in plain sealed envelopes, endorsed "Street Lamps," must reach the undersigned by the August 30, 1952.

The Council does not bind itself to accept the highest or any offer.

R. VINCENT LEWIS,
Clerk of the Council.

Council Offices,
Mablethorpe.

WALES GAS BOARD

RHYMNEY & ABER UNDERTAKING

CORNISH BOILERS

OFFERS are invited for two CORNISH BOILERS 5 ft. 6 in. diameter × 18 ft. 0 in. long. The boilers were constructed in 1912 and 1915 respectively. The purchaser would be required to undertake removal. Particulars may be obtained from :—The General Manager, Wales Gas Board, Rhymney & Aber Undertaking, St. Martin's Road, Caerphilly.

FOR SALE—Motor weighbridge 10-tons, 18 ft. × 8 ft.; best offer for immediate disposal.—ALDER & MACKAY, LTD., Stewart Terrace, EDINBURGH.

PNEUMATIC PICK COMPRESSOR, with 3 take off points, for sale. Armstrong-Whitworth with Dorman petrol engine, 100 c.f.m. at 100 p.s.i. Dennis Chassis, enclosed cab. Photo—F. J. Edwards, Ltd., 359, Euston Road, London, N.W.1. EUSton 4681.

VICKERS Spearing Water Tube Boiler for sale. (similar to Babcock & Wilcox C.T.M.) Evap. 60,000 lb. hr. at 365 lb. sq. in. W.P. with Superheater giving 650°F. final steam temp. Steel cased with Economiser, Fittings and Chimney. Specially examined by Insurance Co. Available immediate delivery.—George Cohen, Sons & Co., Ltd., Wood Lane, London, W.12. *Tel.*: Shepherds Bush 2070 and Stanningley, nr. Leeds. *Tel.*: Pudsey 2241.

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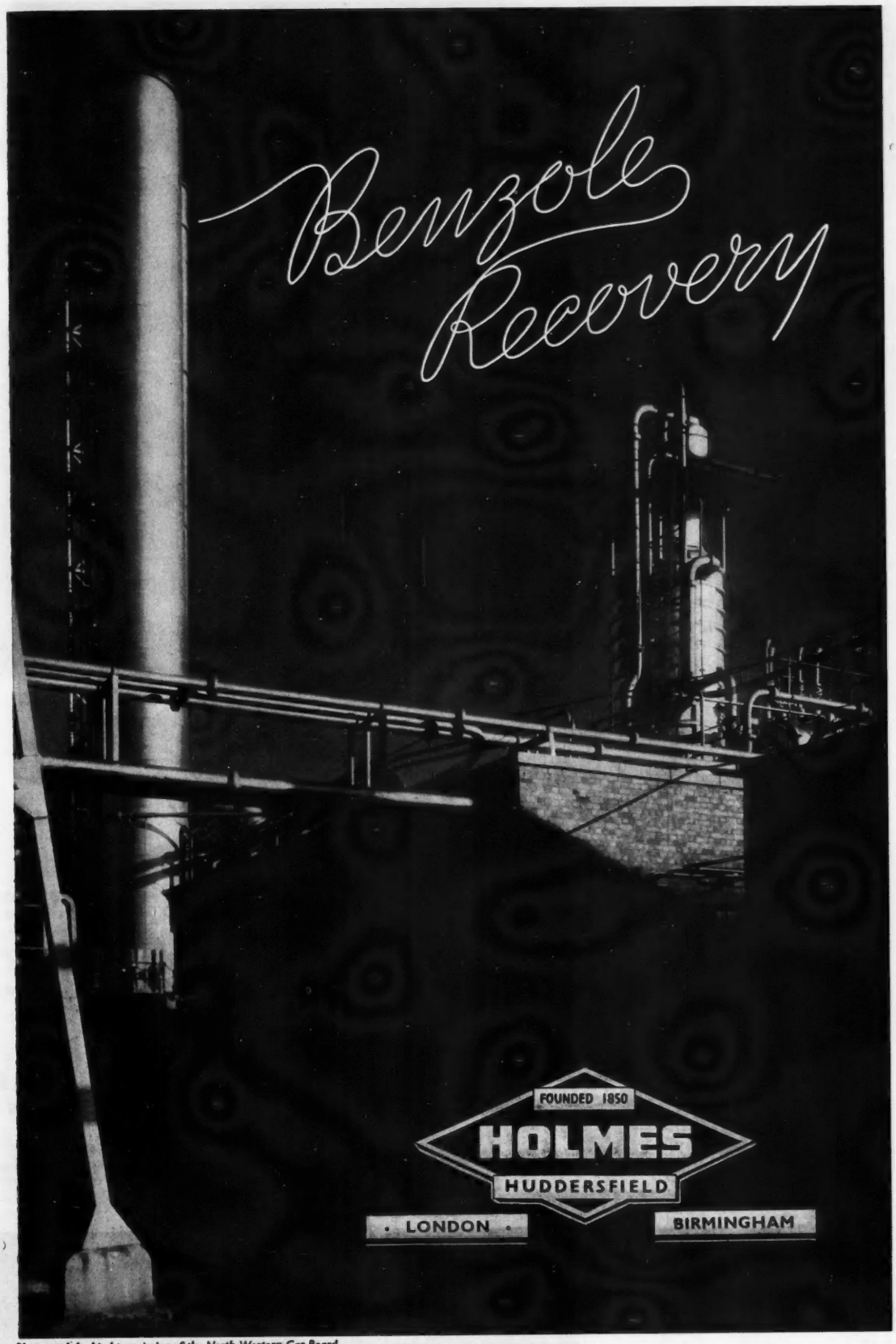

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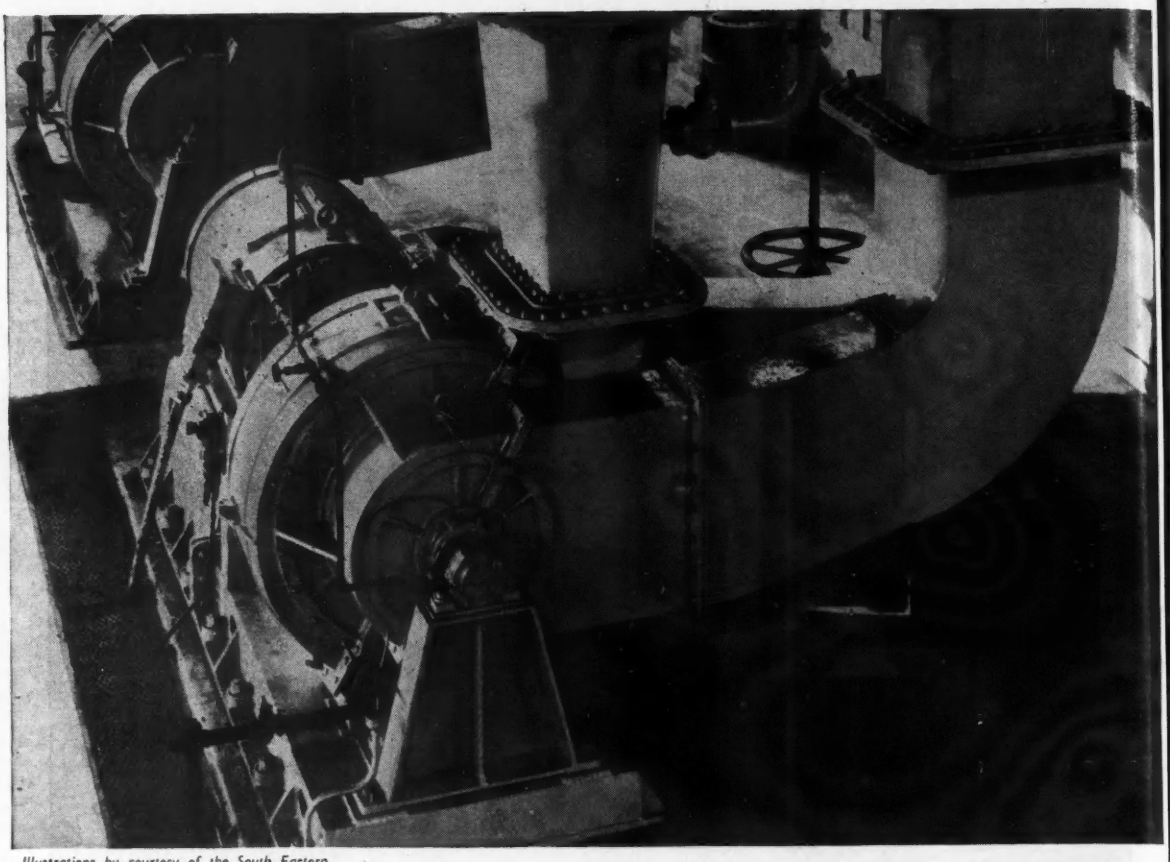

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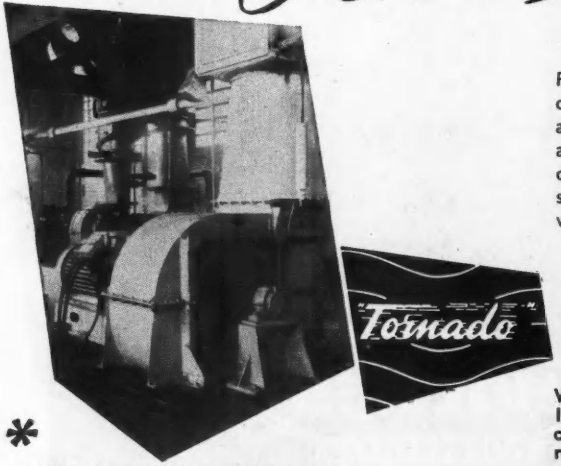
Gas Boosting *



Part of an installation at the East Greenwich Gas-Works for the supply of South London's gas are the "TORNADO" gas boosters illustrated above. Each is capable of shifting over a million cubic feet of producer gas an hour, and each was supplied with cast iron gas tight casings with detachable segments for easy servicing, stainless steel impeller and shaft, self aligning roller bearings and flexible couplings. One of the boosters was arranged for motor drive and the other for steam turbine.

*

LARGE ILLUSTRATION: *42" type 9 double width double inlet gas boosters.*

DUTY: 1,010,000 c.f.h. producer gas at 60°F. Sp.gr. ·907 (air=1) raised to 104°F. saturated giving 28" w.g. differential over inlet and outlet connections taking 138 H.P.

SMALL ILLUSTRATION: *40" type 15 air blowers.*

DUTY:	*Closed outlet*	*Delivery*
Air quantity	*nil*	*12830 c.f.m.*
Speed r.p.m.	*1480*	*1475*
Static pressure	*15.8" w.g.*	*13" w.g.*
Power absorbed	*13 B.H.P.*	*39 B.H.P.*

FAN ENGINEERING AND INDUSTRIAL GAS EQUIPMENT

We are manufacturing gas boosters which cover a range of from 5,000 to 1,500,000 cubic feet per hour, and if you are concerned with the movement of air or gas, ask us to send you Publication No. 5/8, a survey of the standard range of "TORNADO" high pressure blowing and exhausting fans.

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434/9/GJ

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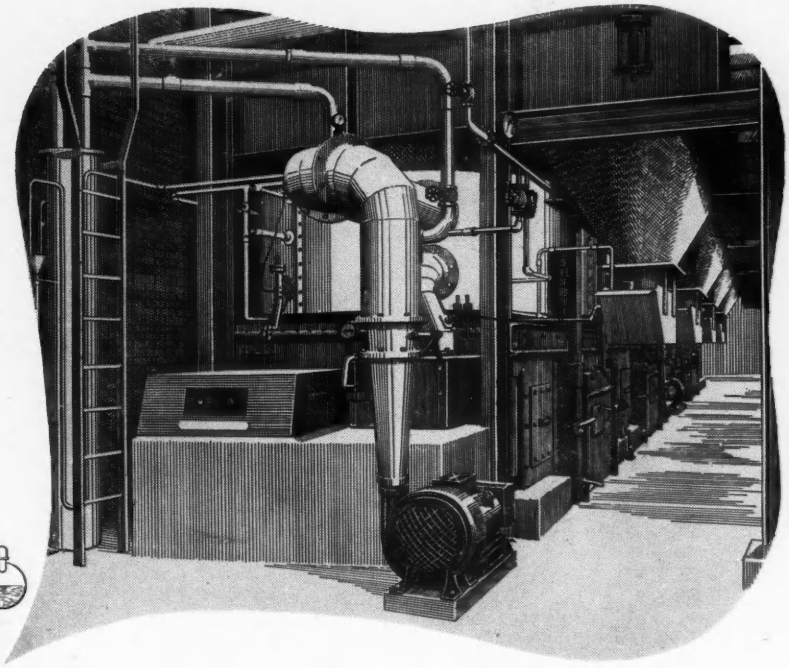
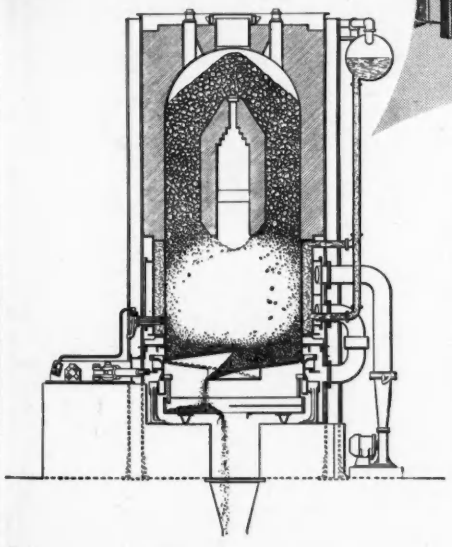
less labour, less fuel –
and the GAS STAYS HOT





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Producer and dust extractor are enclosed in a heavily insulated steel casing. The gas offtake, situated centrally immediately over the flare bed, draws off gas at formation temperature and is completely insulated, so that full advantage is taken of the sensible heat conveyed DIRECT to the settings. Dust extraction efficiency is up to 90%.

To maintain a constant depth of ash below the fuel bed, the speed of the revolving helical grate which removes the ash is automatically controlled by a novel device.

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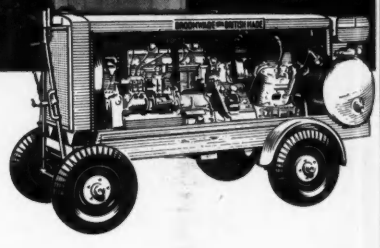
London Office: Columbia House, Aldwych, W.C.2. Phone: HOLborn 4108-9 Grams: Wesgasco, Estrand.

Achievement . . .



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There are few industries or undertakings that do not benefit from the use of "BROOMWADE" Equipment.

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Full details from **BROOM & WADE LTD., HIGH WYCOMBE, ENGLAND.**
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